PHILIPS

PM 3320 Digital Storage Oscilloscope

TEST & MEASUREMENT – OSCILLOSCOPES

QUICK-OPERATING GUIDE

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Introduction

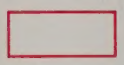
This user guide is intended as an easy reference to supplement the more detailed operating manual of the PM 3320 dual-channel digital strorage oscilloscope. To refresh the operator's memory, it includes the 'quick starter' AUTO-SET facility and the most important functions in this versatile instrument.

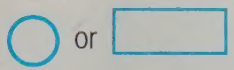
The extensive sampling rate of 250 Mega-samples/second over a vertical bandwidth of 200 MHz (10 bit resolution) is achieved by analog-to-digital conversion of the waveforms, which are digitized at high speed. These signals are stored in four registers for subsequent display.

Warning: The operator safety and installation instructions given in the PM 3320 operating manual must be strictly observed.

Throughout this quick-operating guide, buttons or controls indicated in red call for the following actions:

Push


Push only if the sequence of the quick-operating guide has not been followed


or may be used optionally

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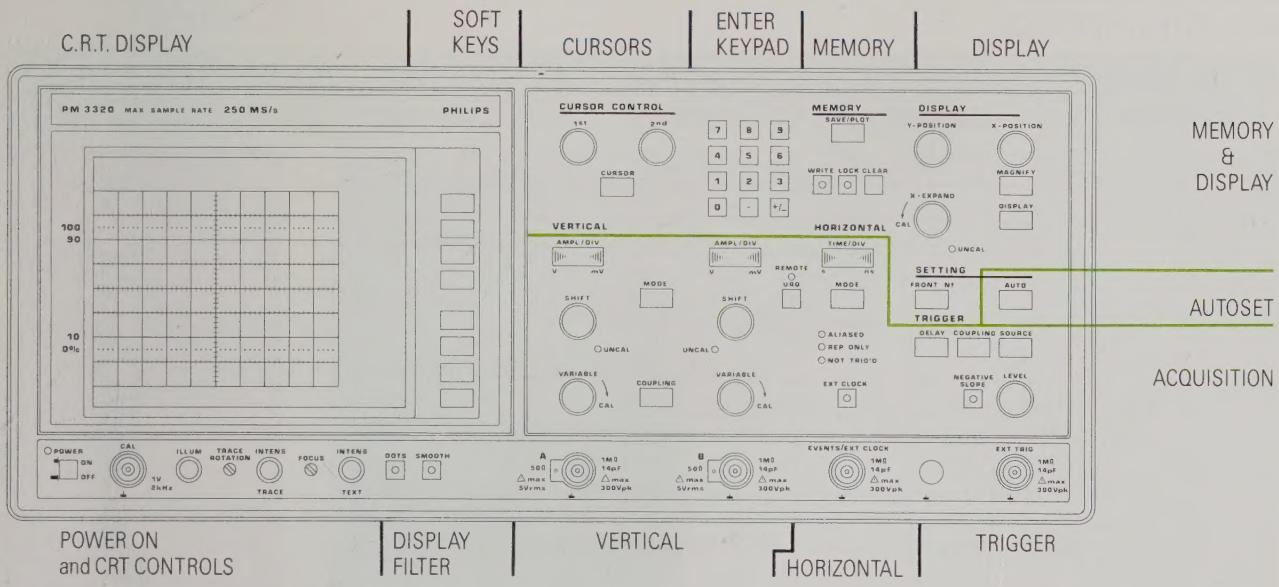
FRONT PANEL FUNCTIONS

Direct selection

Selection for softkey menu



Function			
VERTICAL	MODE	COUPLING	
HORIZONTAL	MODE		
TRIGGER	DELAY	COUPLING	SOURCE
CURSOR CONTROL	CURSOR		
MEMORY	SAVE/PLOT		
DISPLAY	MAGNIFY	DISPLAY	
SETTING	FRONT No		

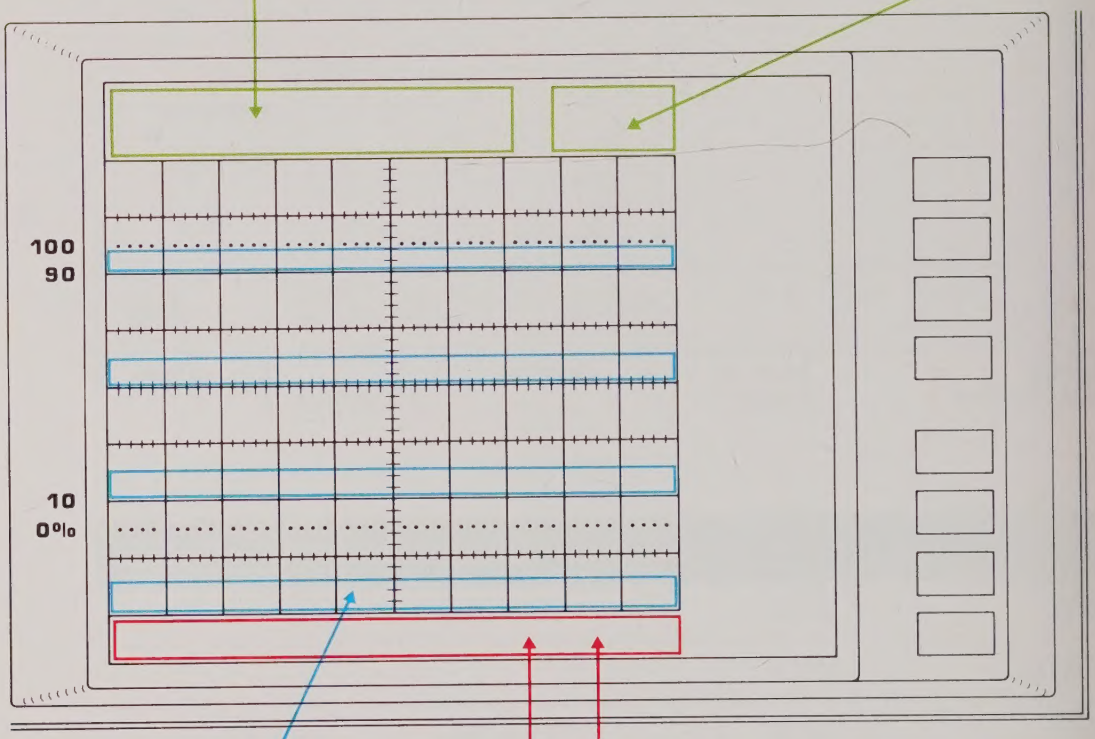
SCREEN LAY-OUT AND TEXT

ACTUAL FRONT PANEL
ACQUISITION SETTINGS

Ch. A input sensitivity	Ch. B input sensitivity	Time-base coefficient	Trigger delay Trigger source

CALCULATION RESULTS

TIME VOLTAGE



REDUCED TEXT

Reg. No.	A-in sens.	B-in sens.	TB coeff.	Trig. delay + mode	Trig. source + slope

FULL TEXT REGISTER

Register Number	A and B input sensitivity	TB coefficient and trigger delay	Horizontal mode Trigger coupling source and slope

or

FULL TEXT FRONT PANEL

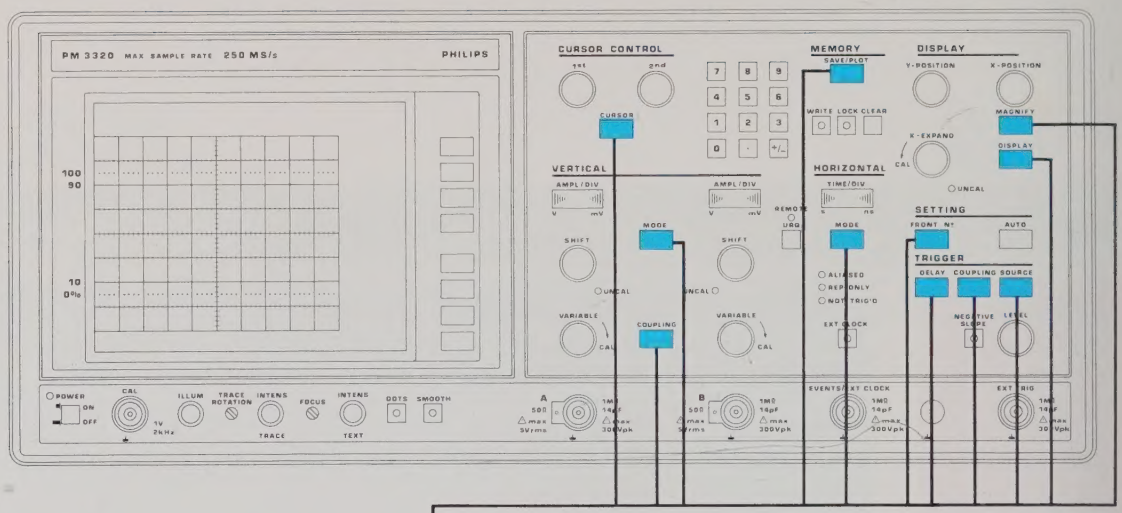
Ch. A input impedance and offset	Ch. B input inpedance and offset	Vertical processing mode	Trigger coupling and slope	Resolution

ON-SCREEN INDICATION

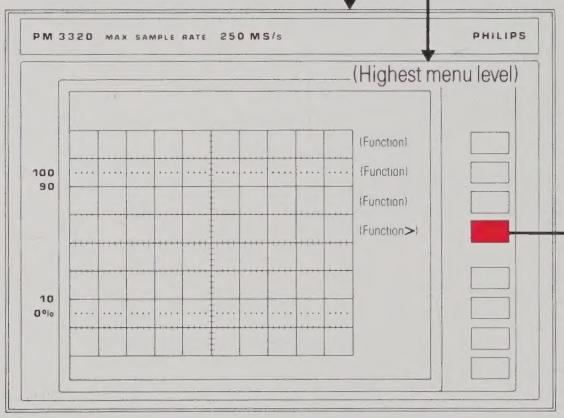
INDICATION	MEANING
A and/or B	CHANNEL IDENT at start of trace (DISPLAY menu)
↑	Trigger level higher than screen area
I	Trigger level for AC or DC triggering
↓	Trigger level lower than screen area
L	Line triggering indication
X	External triggering indication
E	EVENTS trigger level indication
~	Lower accuracy for this function; also pilot lamp
	Positive trigger slope selection
	Negative trigger slope selection
DTS	Value cannot be calculated and is given in dots
^ v	MIN/MAX mode active

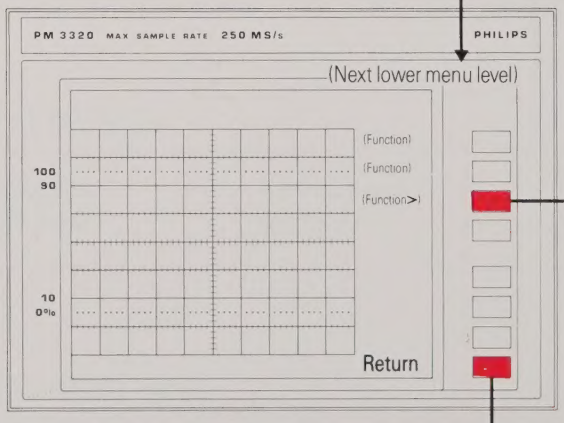
Intensified display text = activated functions

SOFTKEYS MENU STRUCTURE



Select menu required



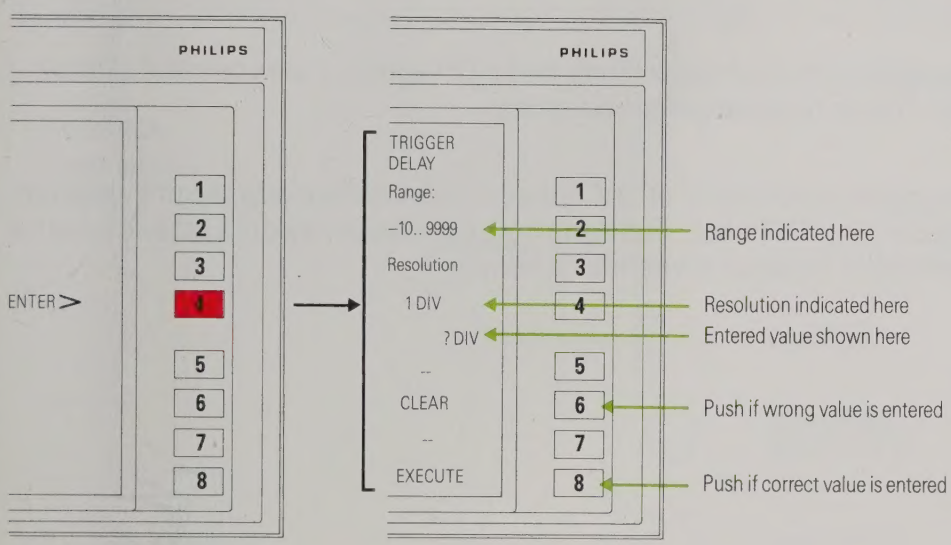


To next lower menu level

USING "ENTER" AND KEYPAD

For the direct entry of various values (such as DELAY, DC-OFFSET, etc), the KEYPAD can be used after pressing the softkey ENTER (always the 4th button).

Enter menu built-up as follows



SINGLE CHANNEL

1. Switch POWER ON and check that the adjacent lamp is lit.
2. Check that the power-up routine is executed.
3. If the instrument fails to operate normally or not all indicator lamps light, switch off for a few seconds.

NOTE:

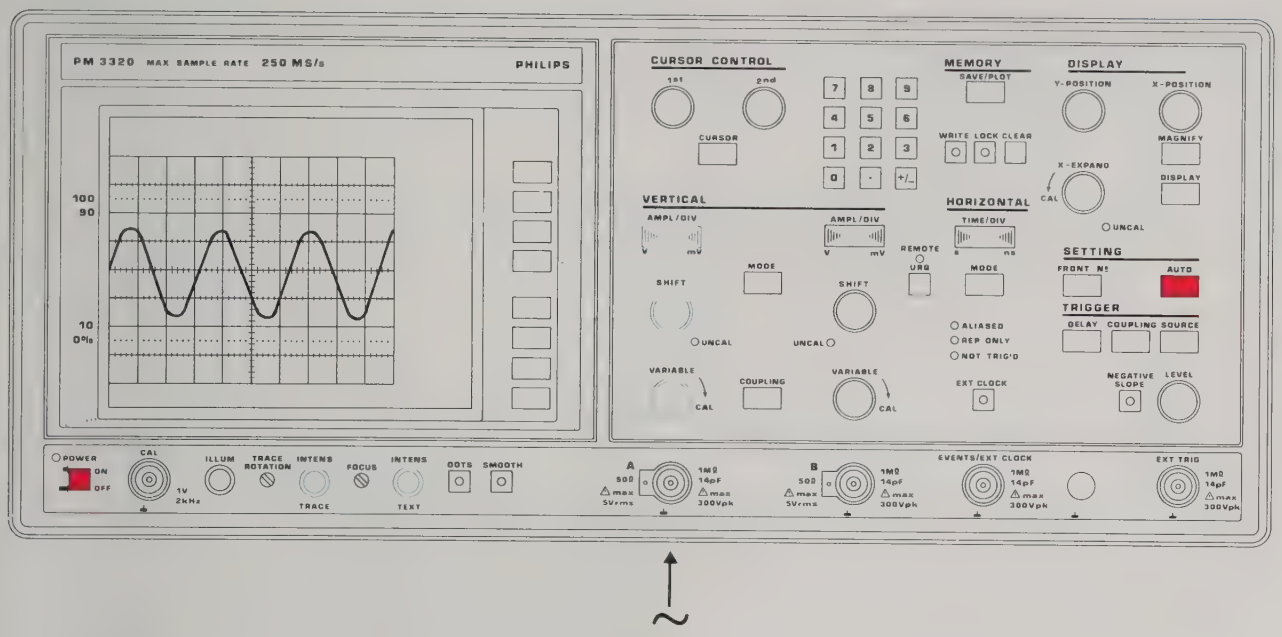
With back-up batteries installed the instrument settings at the previous switch-off will be restored. If no back-up batteries are fitted, then the AUTO-SET routine is performed automatically.

4. Press AUTO
5. Adjust INTENS TRACE and INTENS TEXT controls for optimum brightness.
6. Adjust TRACE ROT preset if baseline of trace is not parallel with the horizontal graticule lines.

NOTE:

The AUTO setting displays the contents of register R0 over the full CRT screen (i.e. a few periods at an amplitude of a few divisions). This can be regarded as an initial setting.

The signal amplitude can now be adjusted by pushing "V" or "mV" in steps of 1-2-5 or continuous by using the vernier control. Vertical shift can be controlled by using "VARIABLE". This means that a d.c. voltage is added or subtracted before the signal is digitised so that the signal can be positioned in relation to the memory.



– POWER ON

– Signal to input A

– AUTO

– Adjustment options

signal smaller signal bigger

signal position (before digitising)

vernier control

NOTE:

■ = push

□ = push only if sequence of quick-operating guide has not been followed

○ or ▭ = may be used optionally

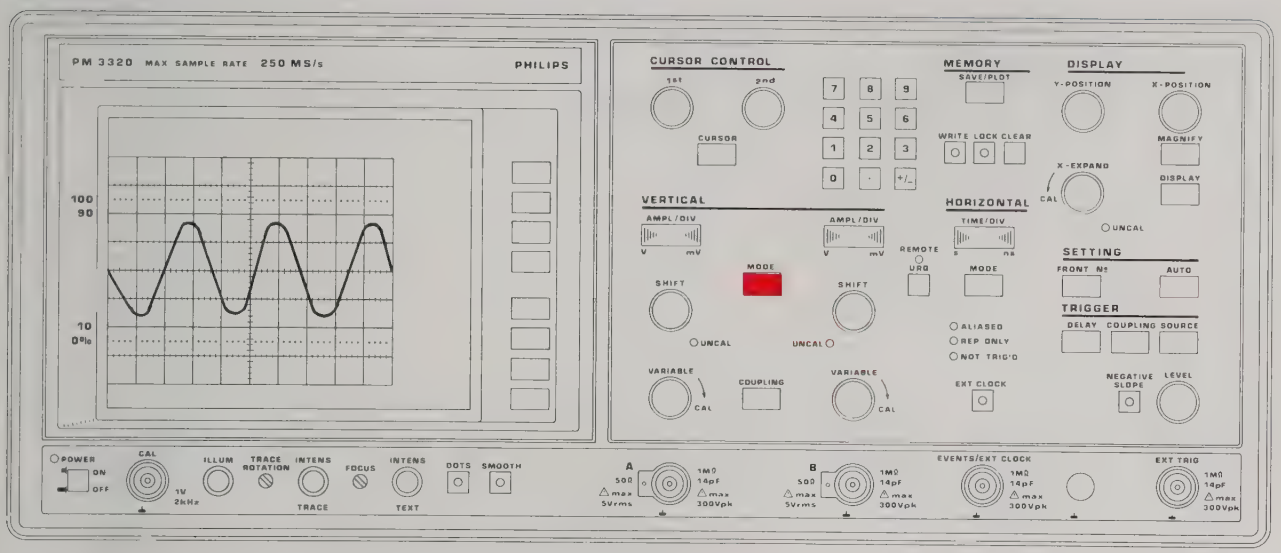
SINGLE CHANNEL "A-INVERT"

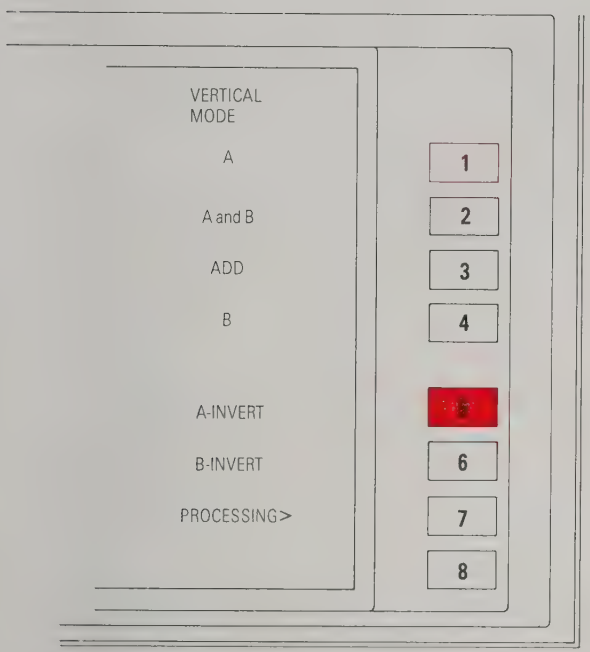
If A-INVERT is required:

- push VERTICAL MODE
- push A-INVERT

Signal is inverted before digitising, indicated by intensified "A-INVERT", but after SHIFT and OFFSET. Therefore d.c.-offset and vertical shift will also be inverted. (Pages 10 and 16).

SINGLE CHANNEL "A-INVERT"

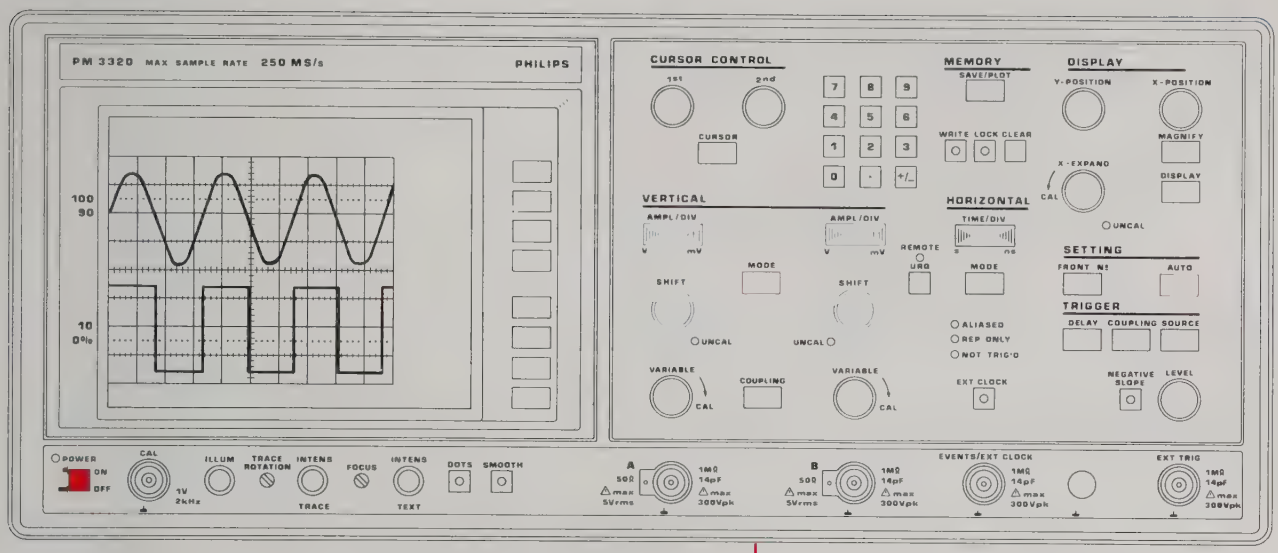


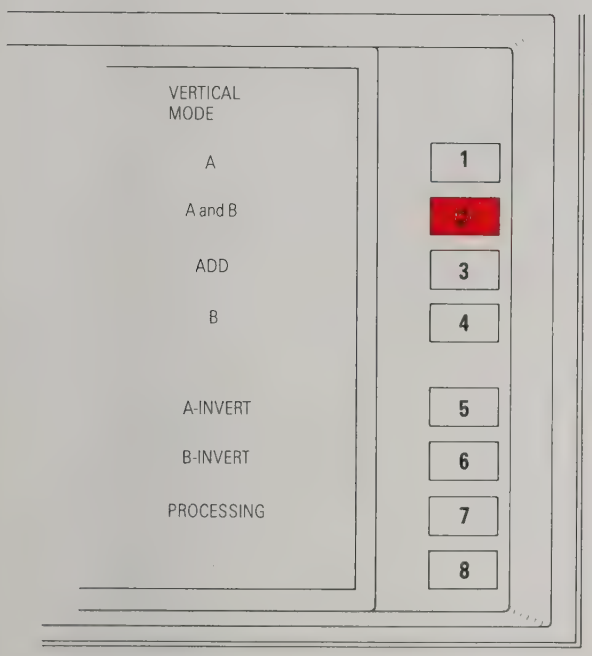


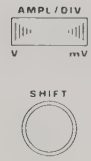
To proceed with next page, push A-INVERT again (so that channel A is no longer inverted).

DUAL CHANNEL

- Push "VERTICAL MODE" if vertical mode menu is not displayed on the screen.
- Push "A and B".
- Adjust position and size of traces A and B with up-down control AMPL/DIV and rotary control SHIfT







To adjust traces

DUAL CHANNEL OPERATION 'OFFSET CHANNEL A'

- Push VERTICAL "COUPLING"
- Push OFFSET (VERTICAL COUPLING A)

Optionally:

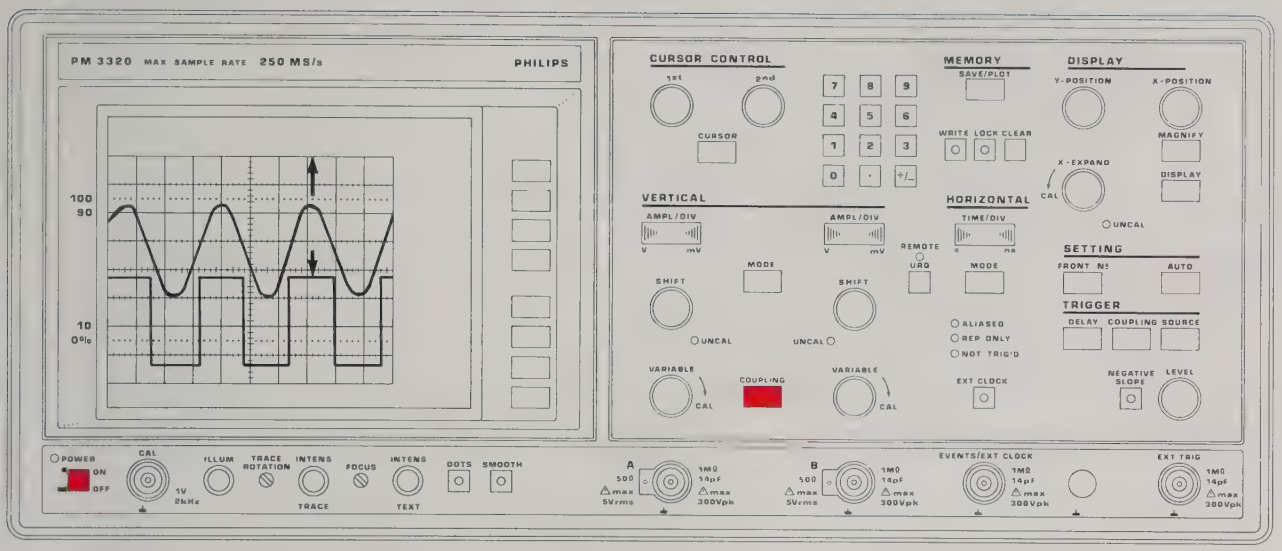
- Push AUTO for automatic d.c.-offset
- Push UP or DOWN for manual selection
- Push ENTER for direct selection (see Page 9)

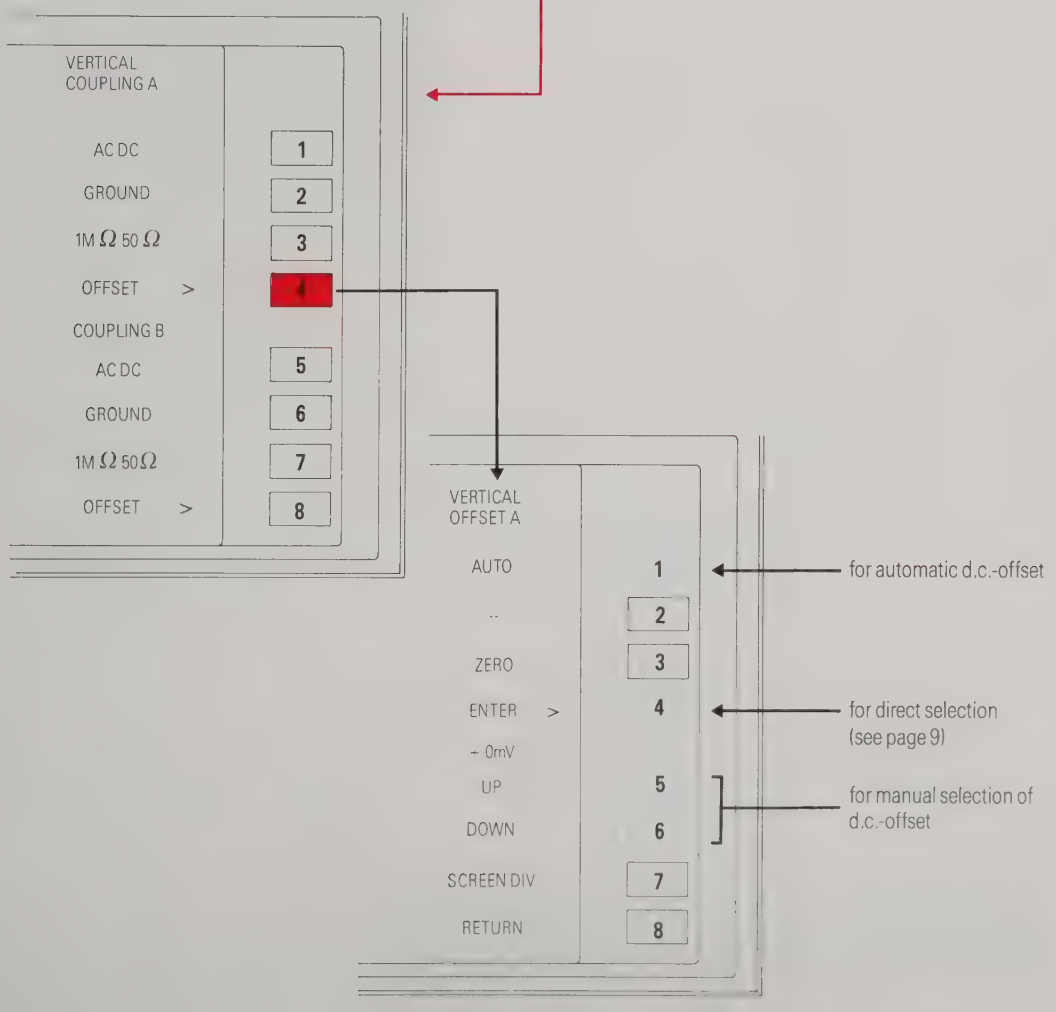
The actual d.c.-offset value is displayed in the softkey area between buttons 4 and 5.

Offset is only possible with DC-coupling. Oscilloscope will automatically select d.c. coupling if the offset is entered (see warning on display).

UP and DOWN will give a voltage offset which depends on the choice of DIV (1 division) or SCREEN (10 divisions).

DUAL CHANNEL OPERATION "OFFSET CHANNEL A"





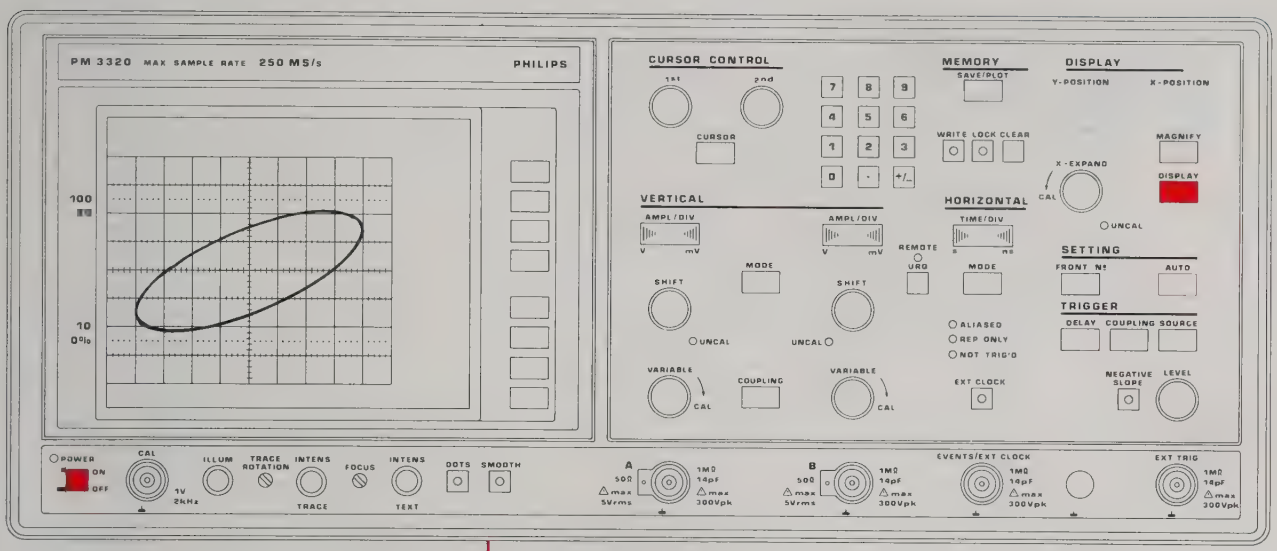
DUAL CHANNEL A versus B

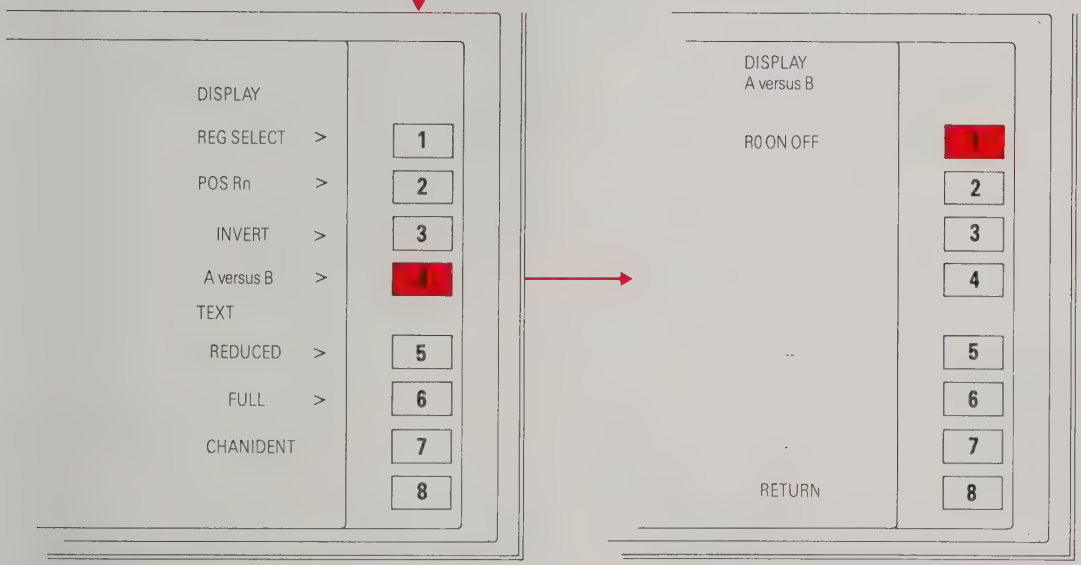
- Push front-panel "DISPLAY"
- Push softkey "INVERT"
- Push softkey "A versus B>"
- Push softkey "R0 ON OFF"

Signals are displayed as "A versus B", indicated by the intensified word "ON" in the softkey area.

NOTES:

- Position can be controlled by "X-POSITION" and "Y-POSITION".
- If only one trace is available, "A versus B" cannot be selected.
- If several registers are displayed, "A versus B" can be selected for each register that has two traces recorded.





After display, push R0 ON OFF to switch off "A versus B" before proceeding to the next page.

HORIZONTAL MAGNIFY

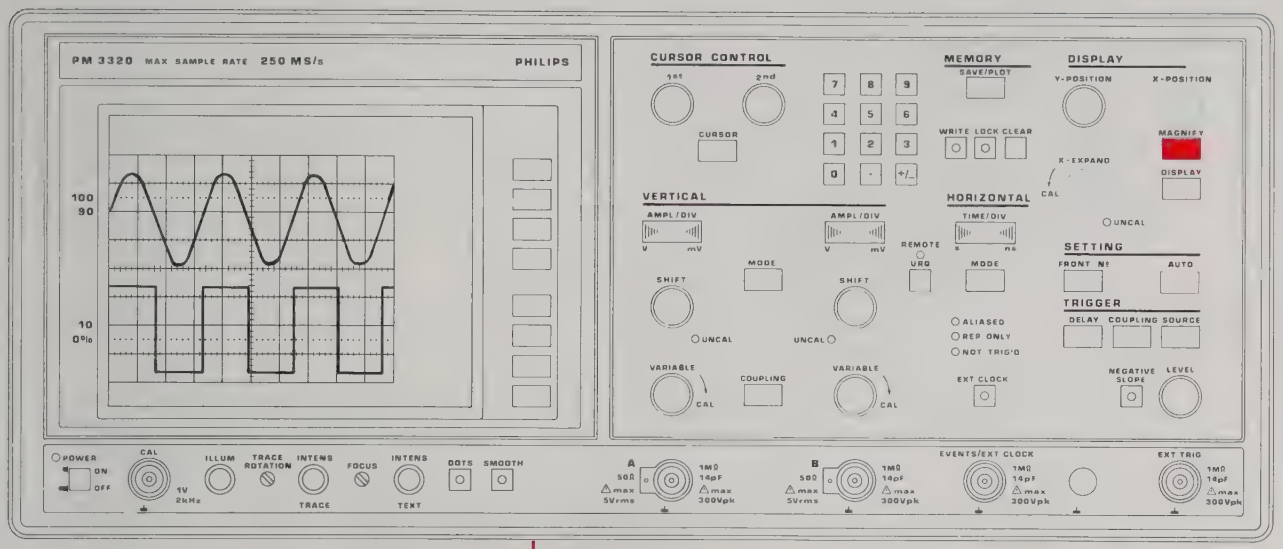
- Push front-panel "MAGNIFY"
- Push softkey "EXPAND" once only:
  - signal is expanded x2
  - signal detail required can be located by using the rotary control "X-POSITION"

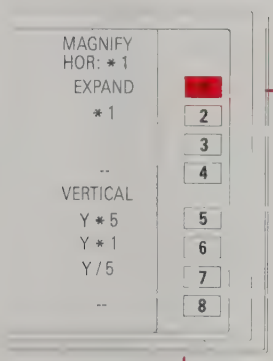
or:

- Push softkey "EXPAND" four times:
  - signal is expanded x16
  - use "X-POSITION" to locate signal detail required

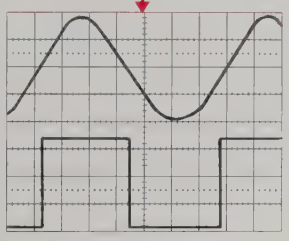
NOTES:

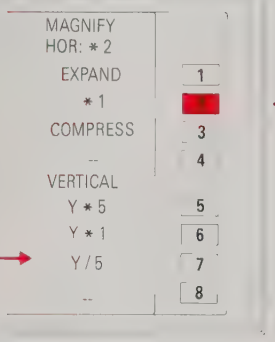
- Expansion takes place from mid-screen
- When "EXPAND" is pushed once, the function "COMPRESS" can be selected which reverses the expand function.
- Extra x2 magnification is available by using the rotary control "X-EXPAND".

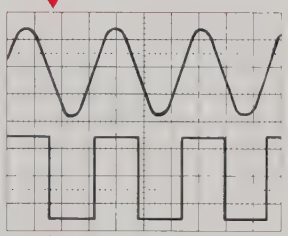




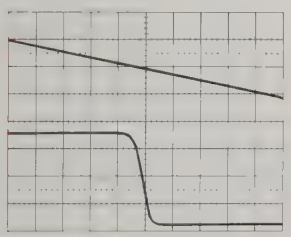
push 1x

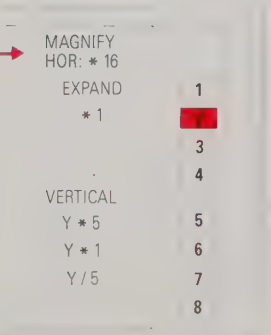






push 4x





NOTE: Push softkey * 1 to cancel magnify if proceeding to next page.

VERTICAL MAGNIFY

– Push front-panel "MAGNIFY"

– For magnification, push softkey "Y * 5":

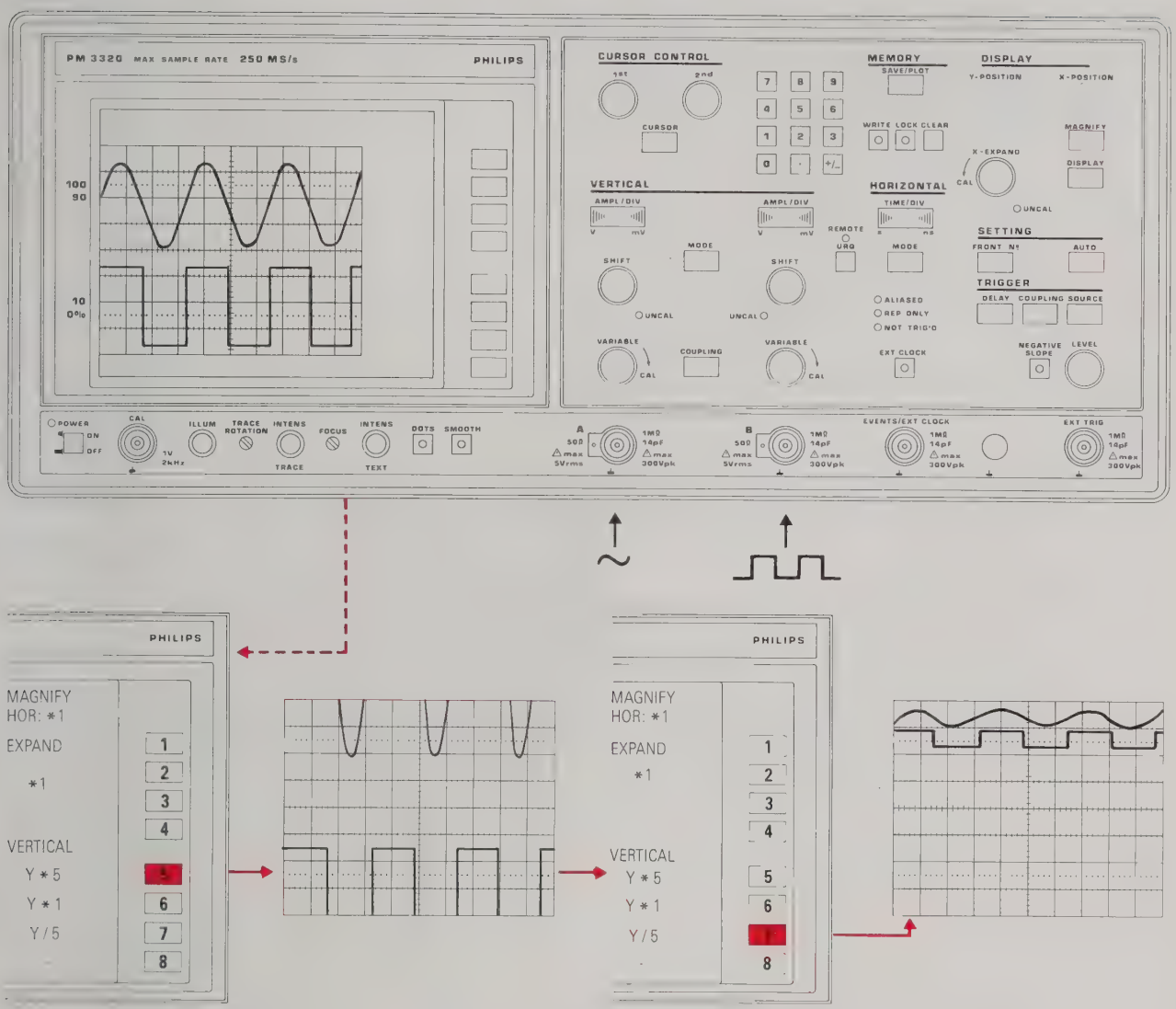
- Memory now displayed over fifty vertical divisions of which eight divisions are visible
- Mid-memory is mid-screen if Y-POSITION control is not used
- Use "Y-POSITION" control to adjust which part should be visible

– For reduction, push softkey "Y / 5":

- Memory now displayed over two vertical divisions.
- Mid-memory is on second graticule line if "Y-POSITION" control is not used.

NOTE:

If more memories are displayed the memories are positioned over the screen.



NOTE: Push softkey Y * 1 to cancel magnify/reduction if not proceeding to next page.

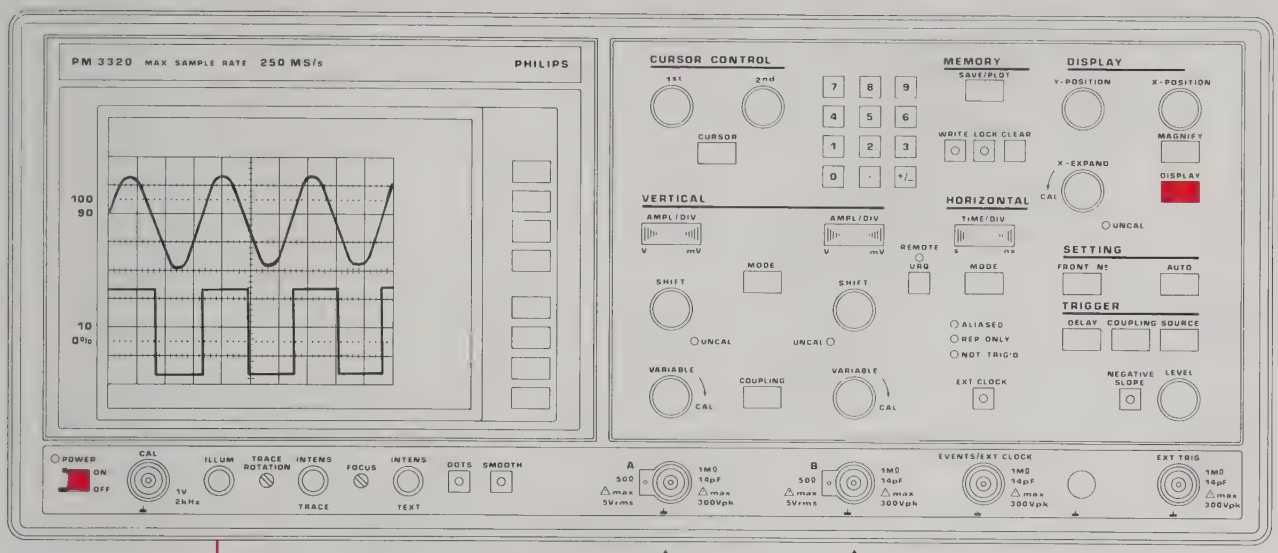
DISPLAY MORE REGISTERS

- Check that the Y/5 reduced trace is still displayed, otherwise first refer to page 23.
- Push front-panel "DISPLAY".
- Push softkey "REG SELECT>".
- Push softkey "R1 ON OFF":
  - Register R1 is displayed on the third and fourth centimetre of the display, indicated by the intensified "ON". If not correctly aligned, calibrate the position (see page 27).

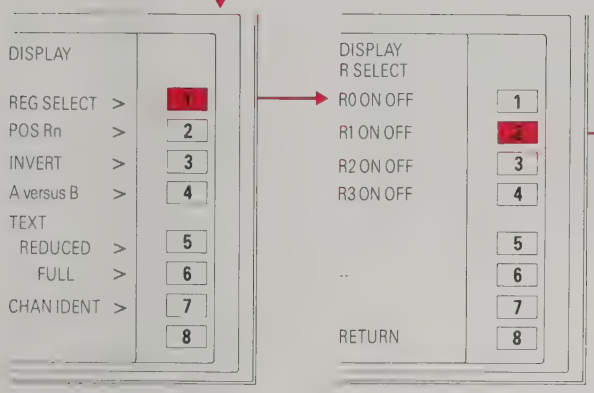
NOTE:

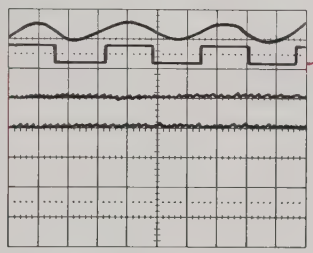
Register contents are not necessarily normal signals.
This depends on what signals were previously stored.

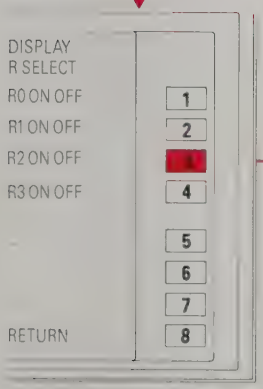
- Push softkey "R2 ON OFF":
  - Register R2 is displayed on fifth and sixth centimetres of the display, indicated by intensified "ON".
- Push softkey "R3 ON OFF":
  - Register R3 is displayed on seventh and eighth centimetres of the display, indicated by intensified "ON".

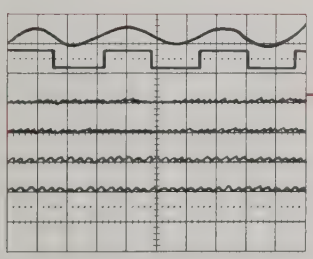


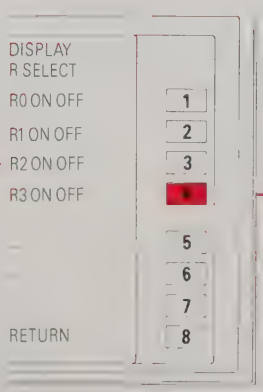
NOTE: Execute Y/5 procedure on page 23 first.

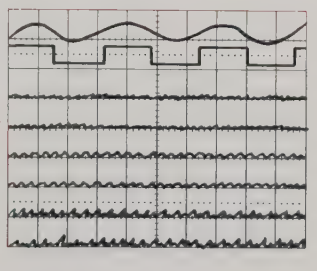












SAVE MEMORY CONTENTS R0

– Push front-panel "SAVE/PLOT"

– Push softkey "SAVE TO R1"

A copy of the memory contents of R0 is stored in Register R1.

NOTE:

- AUTOPLOT only available in SINGLE SHOT or MULTIPLE SHOT mode.

NOTES:

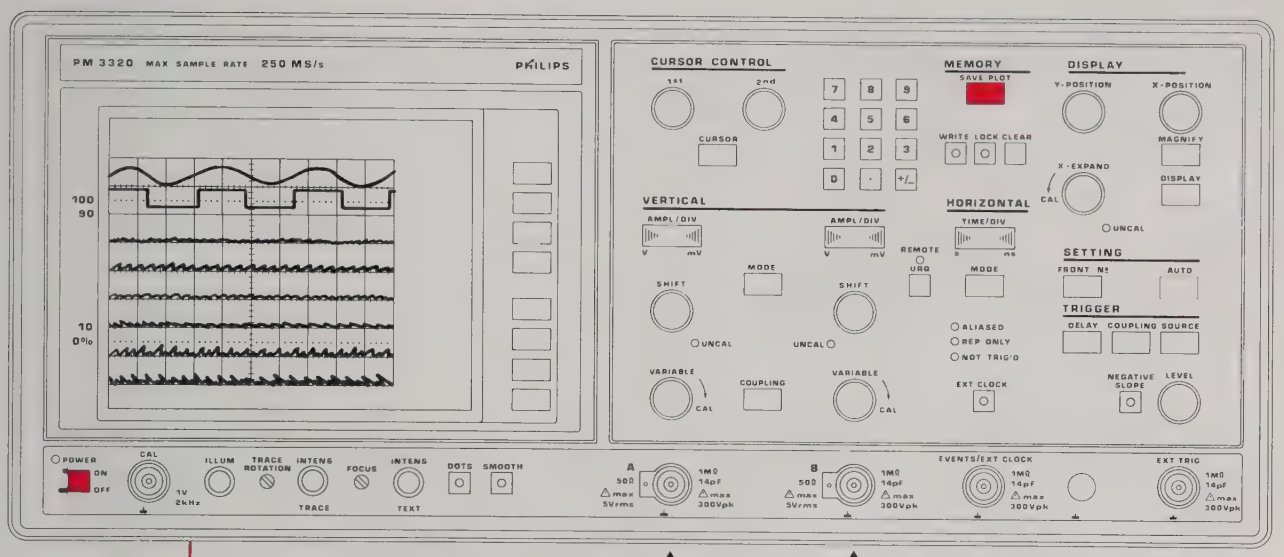
- If R1 is not displayed, the information is saved in R1 although this is not visible.
- If the instrument is locked, the following message becomes visible in the bottom text area for a brief moment:
  "No direct SAVE in LOCK mode.
  Press SAVE again during the display of this message".

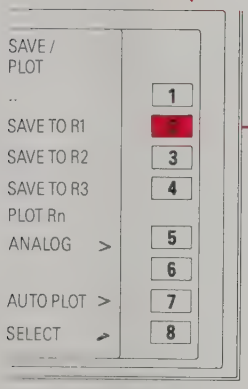
  A SAVE action is then only possible during the display of this message.

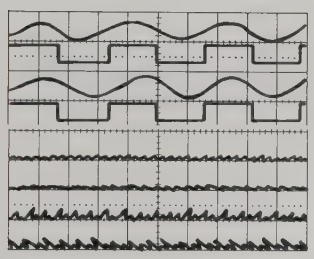
– Push softkey "SAVE TO R2" to save R0 in R2.

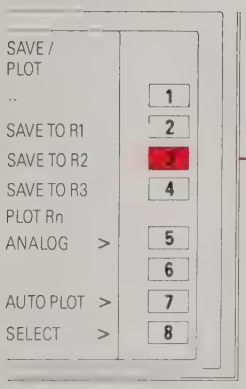
– Push softkey "SAVE TO R3" to save R0 in R3.

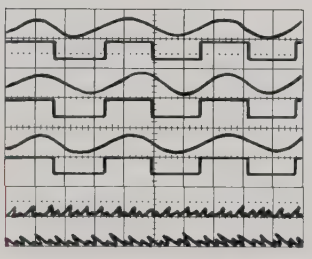
SAVE MEMORY CONTENTS R0

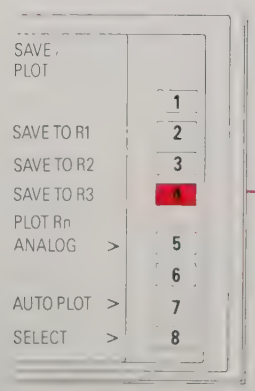


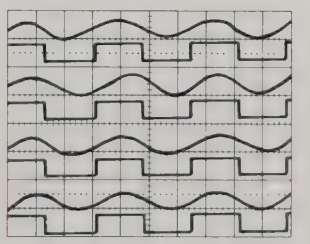












CALIBRATE REGISTER POSITION

– Push front-panel "DISPLAY".

– Push softkey "POS R3>".

NOTE:

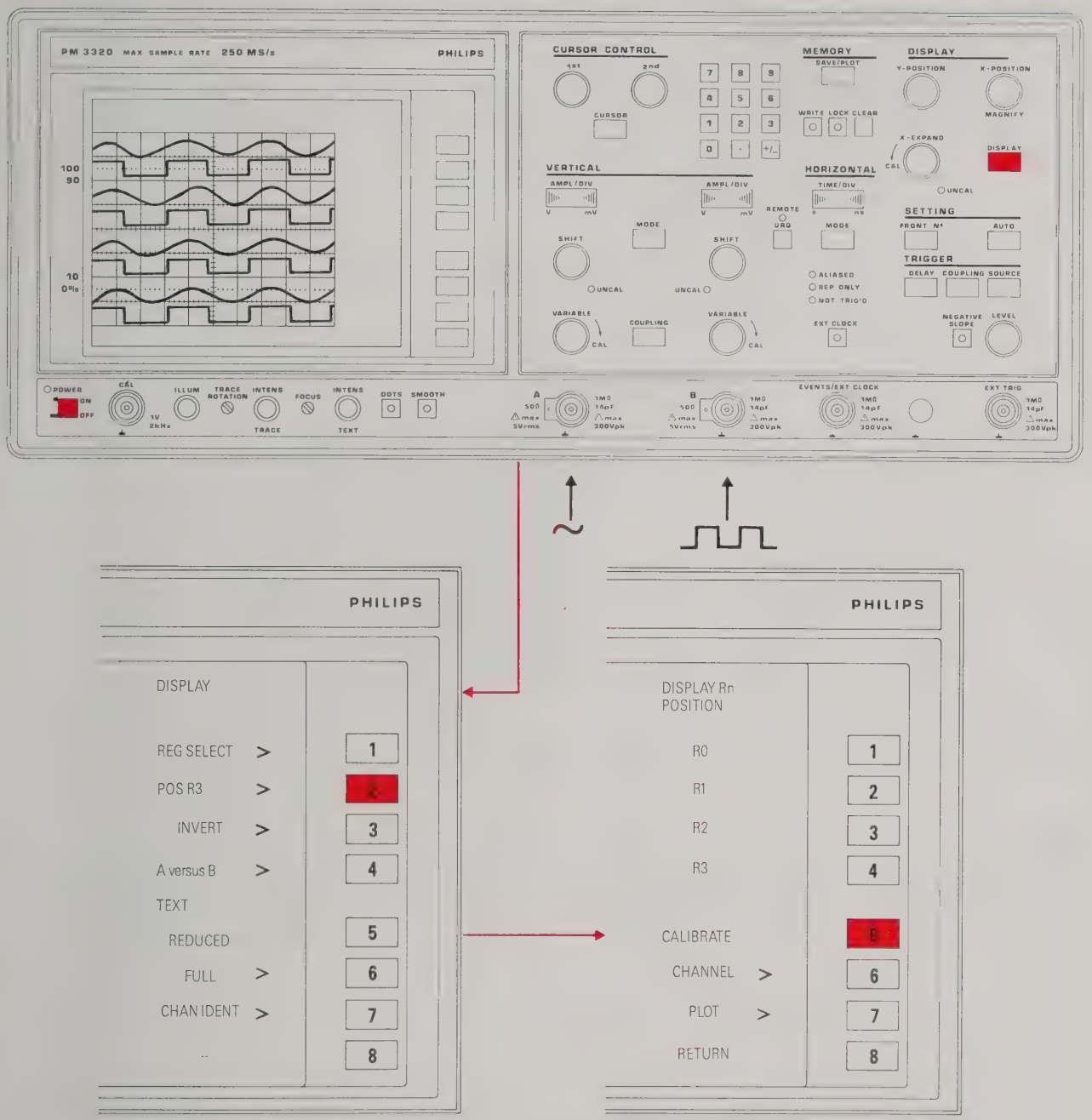
"POS R0>", POS R1>" or "POS R2>" may also be selected depending whether position control is coupled to one of these registers.

– Push softkey "CALIBRATE":

- Position control is now calibrated, which means,
  a) Horizontally: first dot on left graticule line.
  b) Vertically: mid-positions of the four memories are located on the second, fourth, sixth and eighth graticule lines.

REMARK:

If vertical magnify is in Y * 1 or Y * 5 mode, the mid-memories of all registers are at mid-screen.


PM 3320 MAX SAMPLE RATE 250 MS/s
PHILIPS
CURSOR CONTROL
MEMORY
DISPLAY
VERTICAL
HORIZONTAL
SETTING
TRIGGER
PHILIPS
DISPLAY
REG SELECT >
POS R3 >
INVERT >
A versus B >
TEXT
REDUCED
FULL >
CHAN IDENT >
PHILIPS
DISPLAY Rn
POSITION
R0
R1
R2
R3
CALIBRATE
CHANNEL >
PLOT >
RETURN

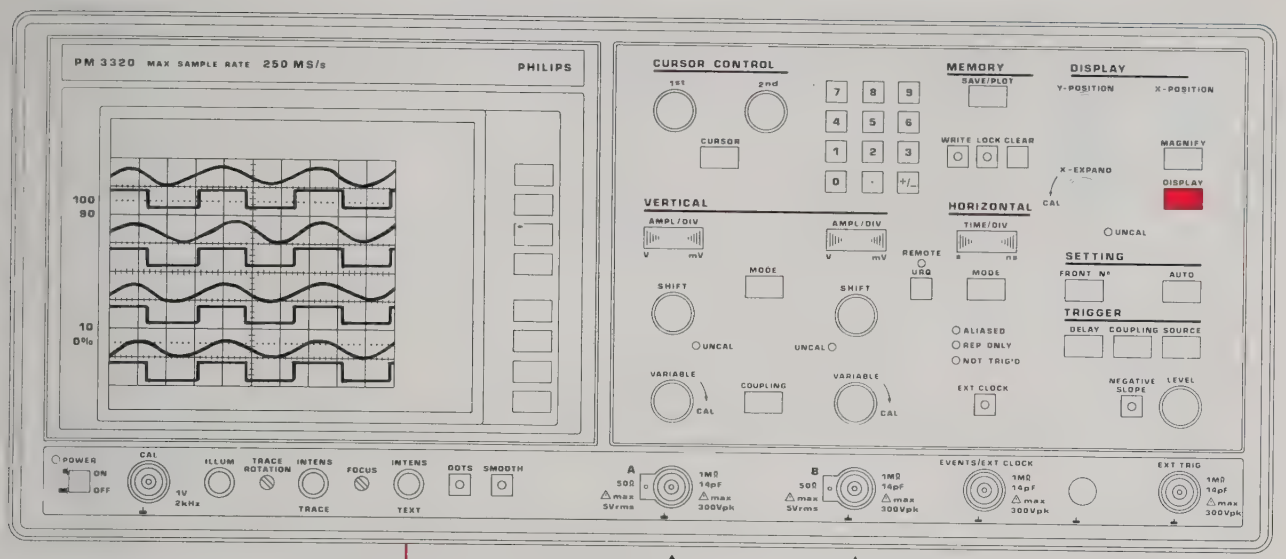
POSITIONING REGISTERS AND TRACES

- Push front-panel "DISPLAY"
  - Position of selected register (POS Rn) can be set with front-panel Y-POSITION and X-POSITION and X-EXPAND controls. Note that the X-POSITION control also operates for all registers simultaneously.
- Push softkey "POS Rn >" to assign controls to another register
- Push softkey "R0", R1", "R2" or "R3", as required.
  - Only registers previously selected for display are available for positioning; valid selected register Rn is intensified.
  - X-POSITION, Y-POSITION and X-EXPAND controls are assigned to the selected register.

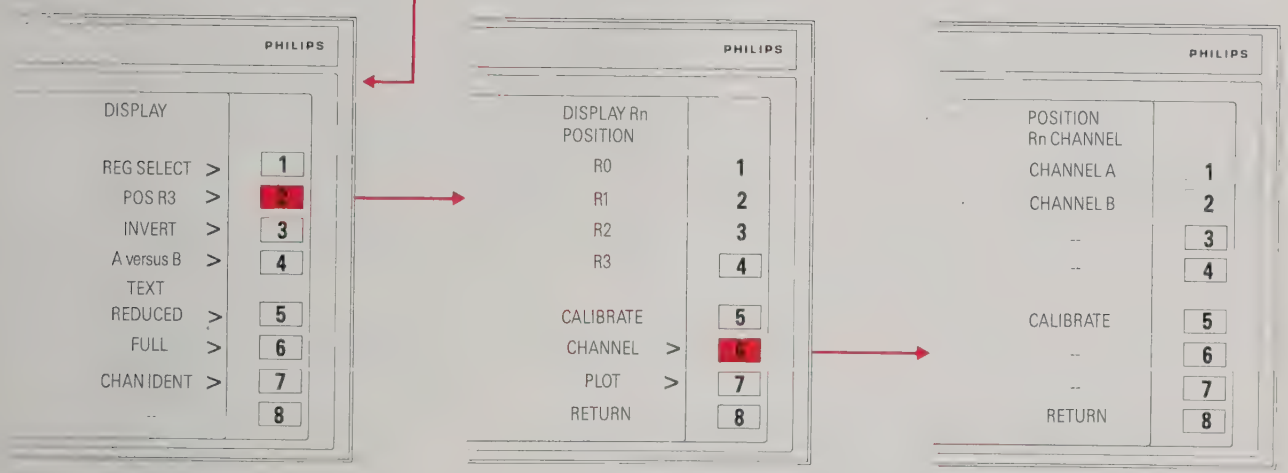
If two traces are present in one register and need positioning with relation to each other:

- Push softkey "CHANNEL".
- Push softkey "CHANNEL A" to enable A trace positioning.
- Push softkey "CHANNEL B" to enable B trace positioning.
  - To reset controls, push "CALIBRATE".
- Push softkey "RETURN" to DISPLAY Rn POSITION

NOTE:
Softkey "PLOT" enables display on screen to be plotted (select softkey "ANALOG" for copy on X-Y recorder).



(Assuming R3 selected)



R3 (Previously selected)

Y-Position

X-Position

Channel of newly selected register

X-Expand

Positioning Controls Assigned to:

TEXT ON SCREEN

The FULL TEXT or REDUCED TEXT (see page 6) can be displayed using the "DISPLAY" menu.

a) FULL TEXT:

For full information on one of the registers selected for display, or additional front panel data:

- Push softkey "FULL"

For full text register:

- Push selected softkey, "R0", "R1", "R2" or "R3".

For full text front panel:

- Push softkey "FRONT".
  - Two extra lines of front-panel information replace the full register information in the bottom text area.
  - Push softkey "TEXT OFF" to blank the bottom text area.
- Push softkey "RETURN".

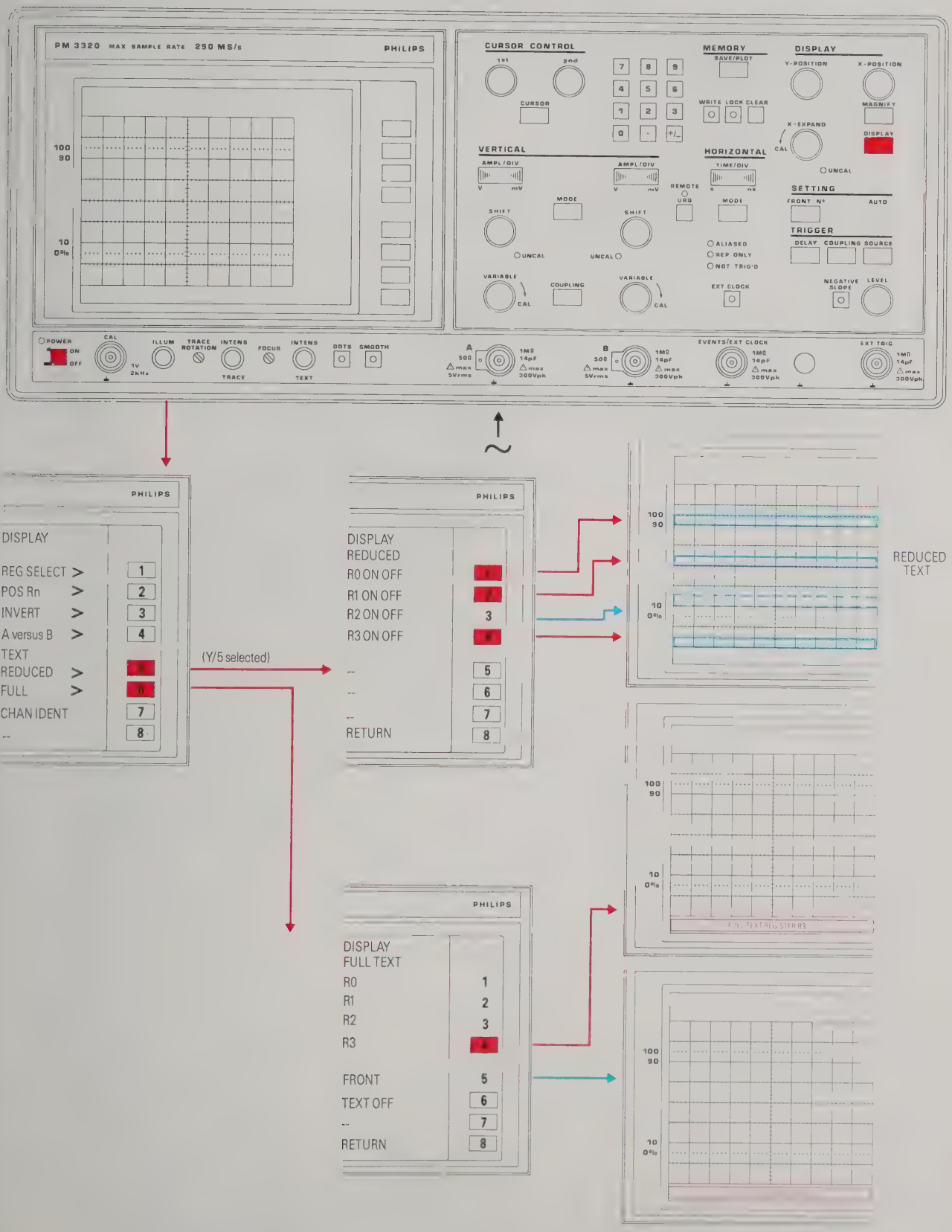
b) REDUCED TEXT

Available when Y/5 selected in MAGNIFY menu.

- Push softkey "REDUCED>"
  - Text "REDUCED" is visible if "Y/5" has been selected.
- Push softkeys R0 to R3 for required reduced text displays
  - Only possible for those registers selected for display.
- Push softkey "RETURN"

NOTE:

Channel A and/or B can be identified by pushing softkey "CHAN IDENT".


PM 3320 MAX SAMPLE RATE 250 MS/s
PHILIPS
CURSOR CONTROL
MEMORY
SAVE/PLOT
DISPLAY
Y-POSITION
X-POSITION
MAGNIFY
X-EXPAND
CAL
DISPLAY
UNCAL
WRITE LOCK CLEAR
CURSOR
VERTICAL
AMPL/DIV
HORIZONTAL
TIME/DIV
SETTING
FRONT N°
AUTO
TRIGGER
DELAY
COUPLING
SOURCE
NEGATIVE SLOPE
LEVEL
MODE
SHIFT
VARIABLE
COUPLING
REMOTE
URQ
ALIASED
REP ONLY
NOT TRIG'D
EXT CLOCK
POWER
ON
OFF
CAL
ILLUM
TRACE ROTATION
INTENS
TRACE
FOCUS
TEXT
DOTS
SMOOTH
EVENTS/EXT CLOCK
EXT TRIG
100
90
10
0%
PHILIPS
DISPLAY
REG SELECT >
POS Rn >
INVERT >
A versus B >
TEXT
REDUCED >
FULL >
CHAN IDENT
--
(Y/5 selected)
DISPLAY
REDUCED
R0 ON OFF
R1 ON OFF
R2 ON OFF
R3 ON OFF
RETURN
REDUCED
TEXT
DISPLAY
FULL TEXT
R0
R1
R2
R3
FRONT
TEXT OFF
RETURN

AVERAGE

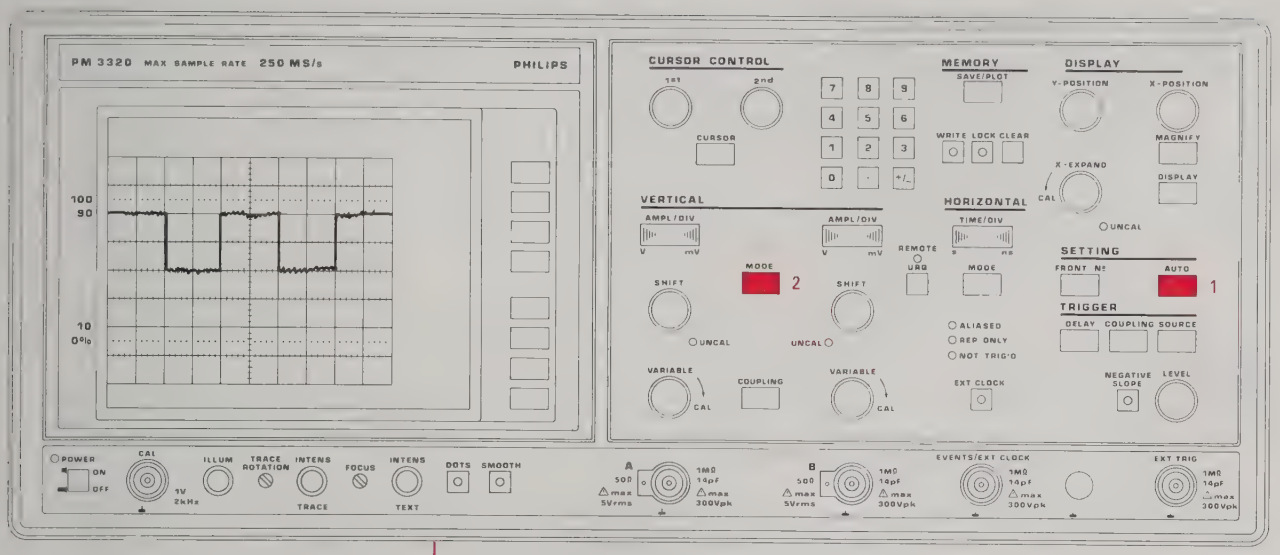
For choice of noise suppression in recurrent mode:

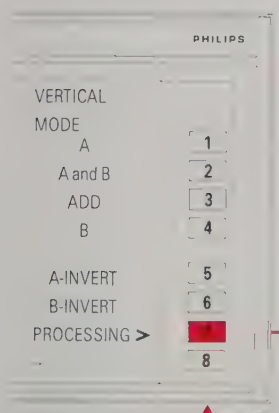
- Push front-panel "VERTICAL MODE".
- Push softkey "PROCESSING".
- Push softkey "AVERAGE".
- Push required softkey (C= 2 to 64).

  - Choose C=2, 4, 8, 16, 32, 64 to increase the average effect by slowing down the dot position change.
  - Every dot is calculated after every sweep:

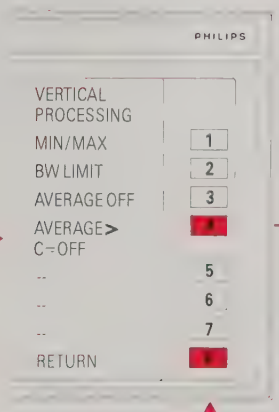
    $$\text{New dot} = \text{previous dot} + \frac{\text{measured} - \text{previous dot}}{C}$$

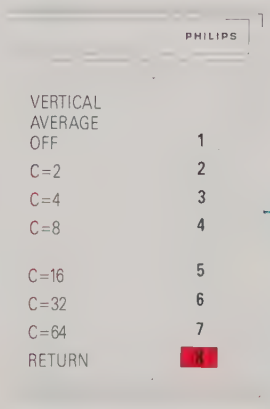
  - For higher resolution, MAX RESOL function is automatically selected in AVERAGE mode.
  - MIN/MAX not possible with AVERAGE mode.

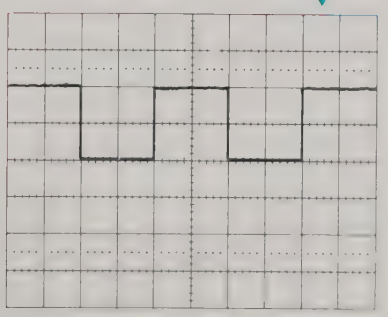

PM 3320 MAX SAMPLE RATE 250 MS/s
PHILIPS
CURSOR CONTROL
MEMORY
DISPLAY
VERTICAL
HORIZONTAL
SETTING
TRIGGER
MODE
2
1


PHILIPS
VERTICAL
MODE
A 1
A and B 2
ADD 3
B 4
A-INVERT 5
B-INVERT 6
PROCESSING > 7
8

3


PHILIPS
VERTICAL PROCESSING
MIN/MAX 1
BW LIMIT 2
AVERAGE OFF 3
AVERAGE > C=OFF 4
-- 5
-- 6
-- 7
RETURN 8


PHILIPS
VERTICAL AVERAGE
OFF 1
C=2 2
C=4 3
C=8 4
C=16 5
C=32 6
C=64 7
RETURN 8



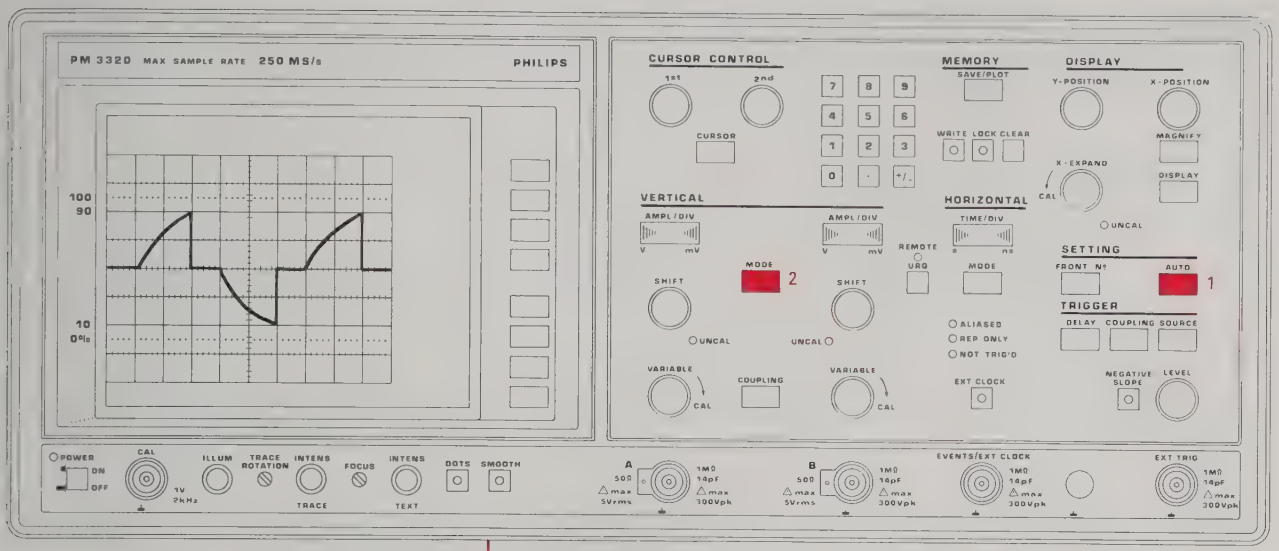
MIN/MAX

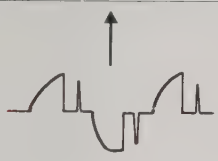
For capturing and displaying signals with frequency components higher than the sampling rate:

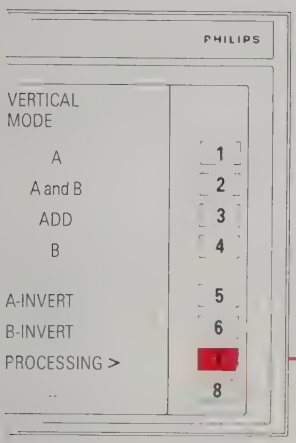
- Push front-panel "VERTICAL MODE"
- Push softkey "PROCESSING"
- Push softkey "MIN/MAX"

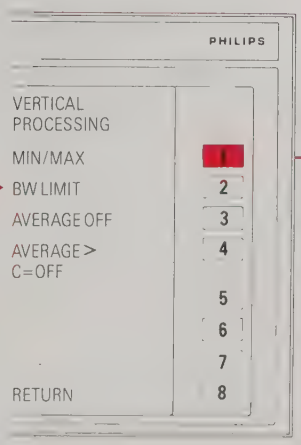
NOTES:

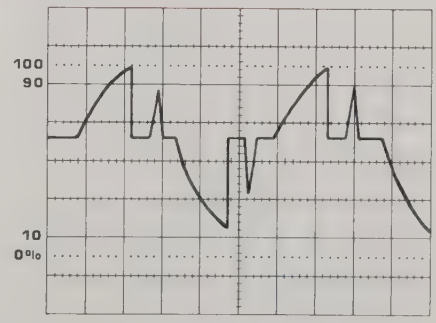
- Useful for catching fast glitches.
- Useful for indicating modulation envelopes.
- Not available at time-base speeds faster than 5 us/div. (screen message and auto switch off/restore)
- Glitches shorter than 20 ns not detected if present during resetting of peak detectors.
- MIN/MAX not available in combination with AVERAGE function.


PM 3320 MAX SAMPLE RATE 250 MS/s
PHILIPS
CURSOR CONTROL
MEMORY
SAVE/PLOT
DISPLAY
Y-POSITION
X-POSITION
MAGNIFY
X-EXPAND
DISPLAY
VERTICAL
AMPL/DIV
HORIZONTAL
TIME/DIV
MODE
2
SHIFT
REMOTE
URG
SETTING
FRONT N°
AUTO
1
TRIGGER
DELAY
COUPLING
SOURCE
ALIASED
REP ONLY
NOT TRIG'D
VARIABLE
CAL
COUPLING
EXT CLOCK
NEGATIVE SLOPE
LEVEL
POWER
ON
OFF
ILLUM
TRACE ROTATION
INTENS
TRACE
FOCUS
TEXT
DOTS
SMOOTH
EVENTS/EXT CLOCK
EXT TRIG




PHILIPS
3
VERTICAL MODE
A
A and B
ADD
B
A-INVERT
B-INVERT
PROCESSING >
1
2
3
4
5
6
7
8


PHILIPS
VERTICAL PROCESSING
MIN/MAX
BW LIMIT
AVERAGE OFF
AVERAGE >
C=OFF
RETURN
1
2
3
4
5
6
7
8


100
90
10
0%

TIME MEASUREMENTS

For measuring time, reciprocal time, frequency, risetime between two cursor settings for registers selected via the DISPLAY menu:

- Push front-panel "CURSOR"
- Push indicated softkey R0 A
  - Cursors visible on screen for selected (intensified) channel. (Push softkey again if other channel required).
- Adjust front-panel 1st and 2nd cursor controls to position the cursors to the desired measuring points on the horizontal axis.

Time:

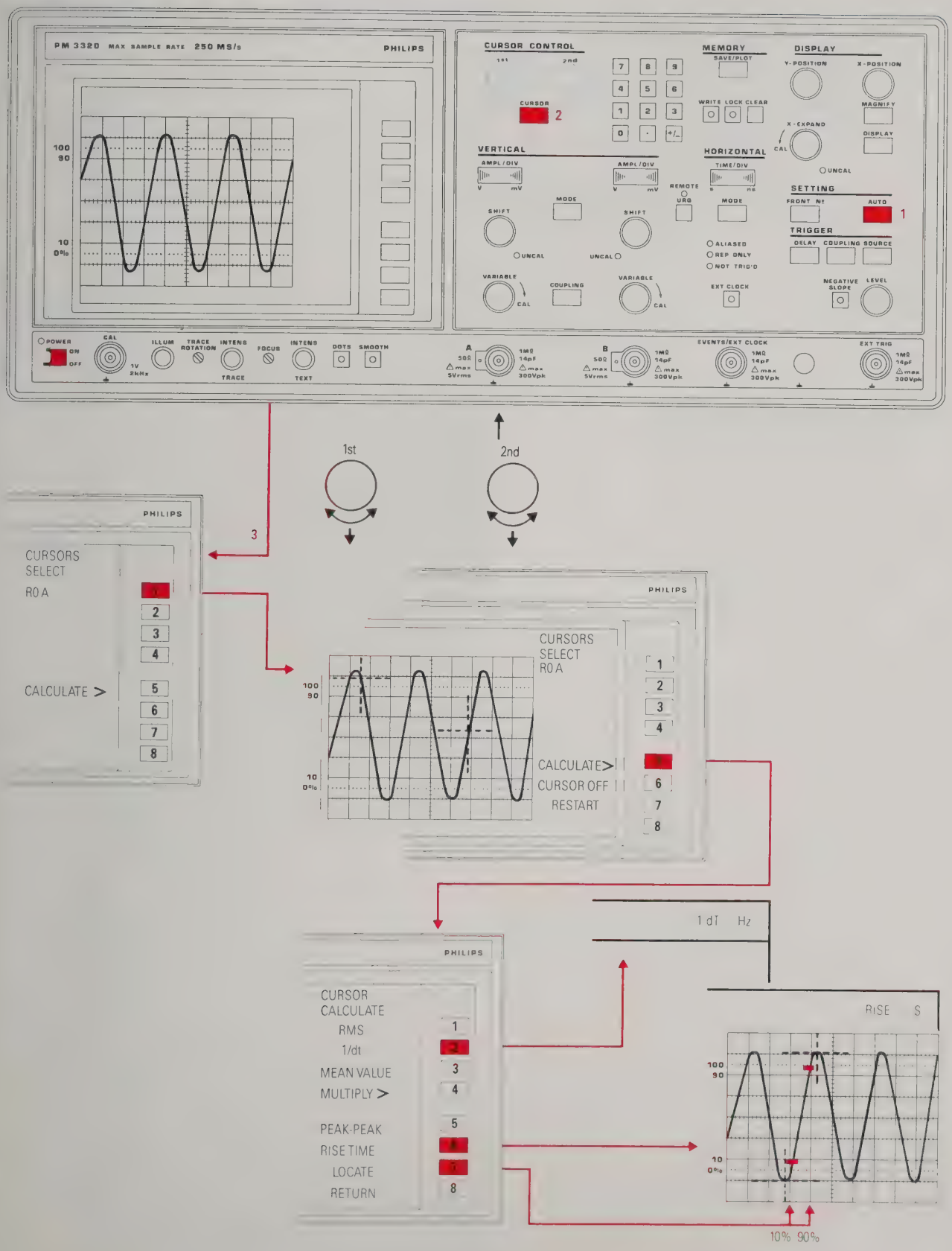
- Top text area gives display of time (dt) and voltage (dV).

1/dt or Frequency:

- Push softkey "CALCULATE"
- Push softkey "1/dt"
  - reciprocal time is given in top text area. If cursors are one wavelength apart this represents frequency in Hz.

Rise-time:

- Push softkey "RISE TIME"
  - This rise- or fall-time (-) of the first 10-90% of the voltage after the first cursor is calculated and shown in the top text area.
- Push softkey "LOCATE" (visible when "RISE TIME" or "PEAK-PEAK" selected)
  - Two markers are displayed on the 10% and 90% measured points.


PM 3320 MAX SAMPLE RATE 250 MS/s
PHILIPS
CURSOR CONTROL
MEMORY
DISPLAY
VERTICAL
HORIZONTAL
SETTING
TRIGGER
1st
2nd
CURSORS SELECT
R0 A
CALCULATE >
CURSOR OFF
RESTART
CURSOR CALCULATE
RMS
1/dt
MEAN VALUE
MULTIPLY >
PEAK-PEAK
RISE TIME
LOCATE
RETURN
1 dT Hz
RISE S
10%
90%

VOLTAGE MEASUREMENTS Cursor selected

For measuring voltage (dV), RMS, MEAN VALUE, PEAK-PEAK between two cursor settings, for registers selected via the DISPLAY menu:

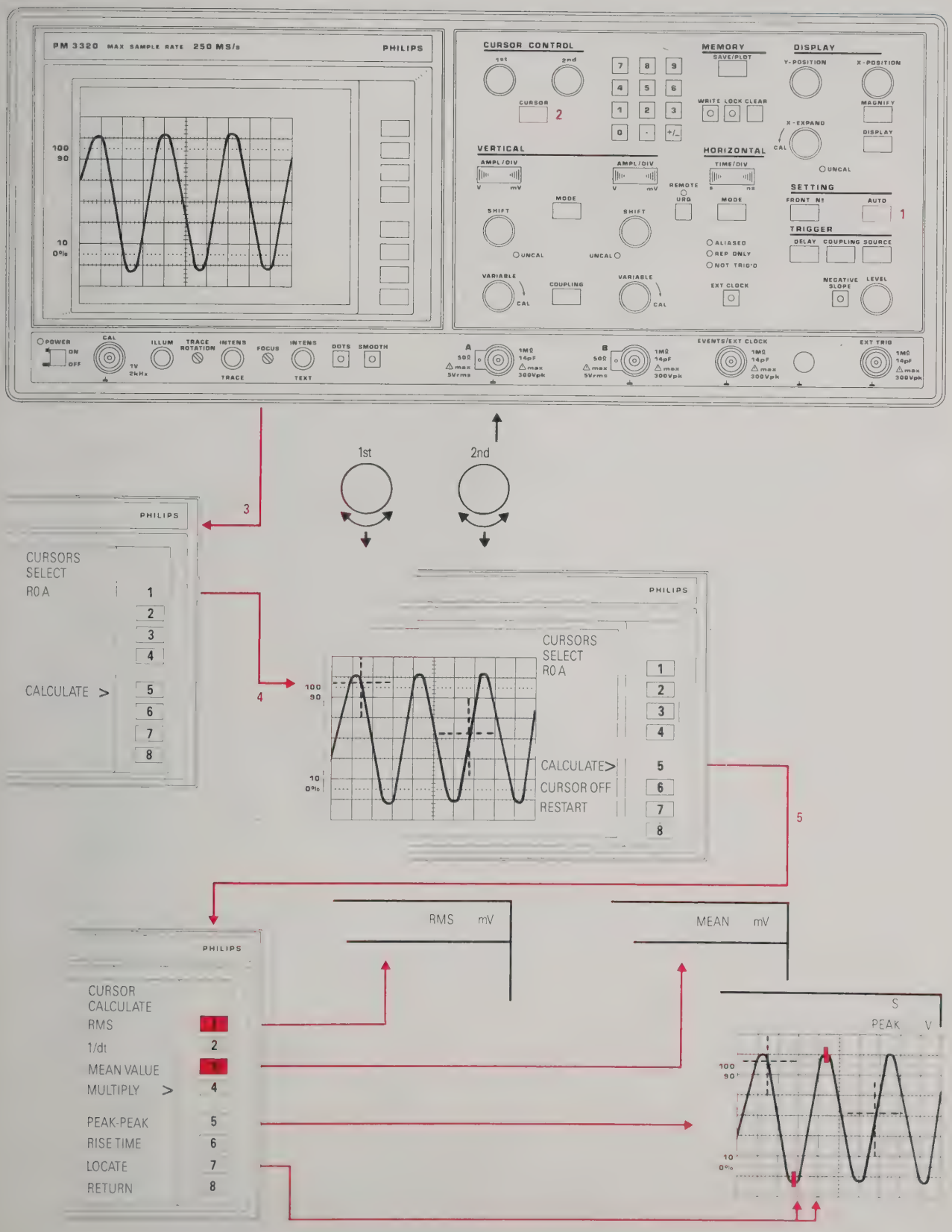
- Push indicated softkeys, "R0" to "R3", as required.
  - Cursors visible on screen for selected (intensified) channel. (Push softkey again if other channel required).
- Adjust front-panel 1st and 2nd cursor controls to position the cursors to the desired measuring points on the vertical axis.

Voltage (dV):

- Top text area gives display of voltage (dV).

RMS, MEAN VALUE, PEAK-PEAK

- Push softkey "CALCULATE"
- Push softkeys:
  - "RMS" or
  - "MEAN VALUE" or
  - "PEAK-PEAK" (softkey "LOCATE" is available)


PM 3320 MAX SAMPLE RATE 250 MS/s
PHILIPS
CURSOR CONTROL
MEMORY
DISPLAY
VERTICAL
HORIZONTAL
SETTING
TRIGGER
1st
2nd
CURSOR
2
SAVE/PLOT
WRITE LOCK CLEAR
Y-POSITION
X-POSITION
MAGNIFY
X-EXPAND
DISPLAY
AMPL/DIV
TIME/DIV
MODE
SHIFT
VARIABLE
COUPLING
REMOTE
URG
ALIASED
REP ONLY
NOT TRIG'D
EXT CLOCK
FRONT N°
AUTO
1
DELAY
COUPLING
SOURCE
NEGATIVE SLOPE
LEVEL
POWER
ON
OFF
CAL
ILLUM
TRACE ROTATION
INTENS
TRACE
FOCUS
INTENS
TEXT
DOTS
SMOOTH
EVENTS/EXT CLOCK
EXT TRIG
3
4
5
CURSORS SELECT
R0 A
CALCULATE >
CURSOR OFF
RESTART
CURSOR CALCULATE
RMS
1/dt
MEAN VALUE
MULTIPLY >
PEAK-PEAK
RISE TIME
LOCATE
RETURN
RMS mV
MEAN mV
S
PEAK V

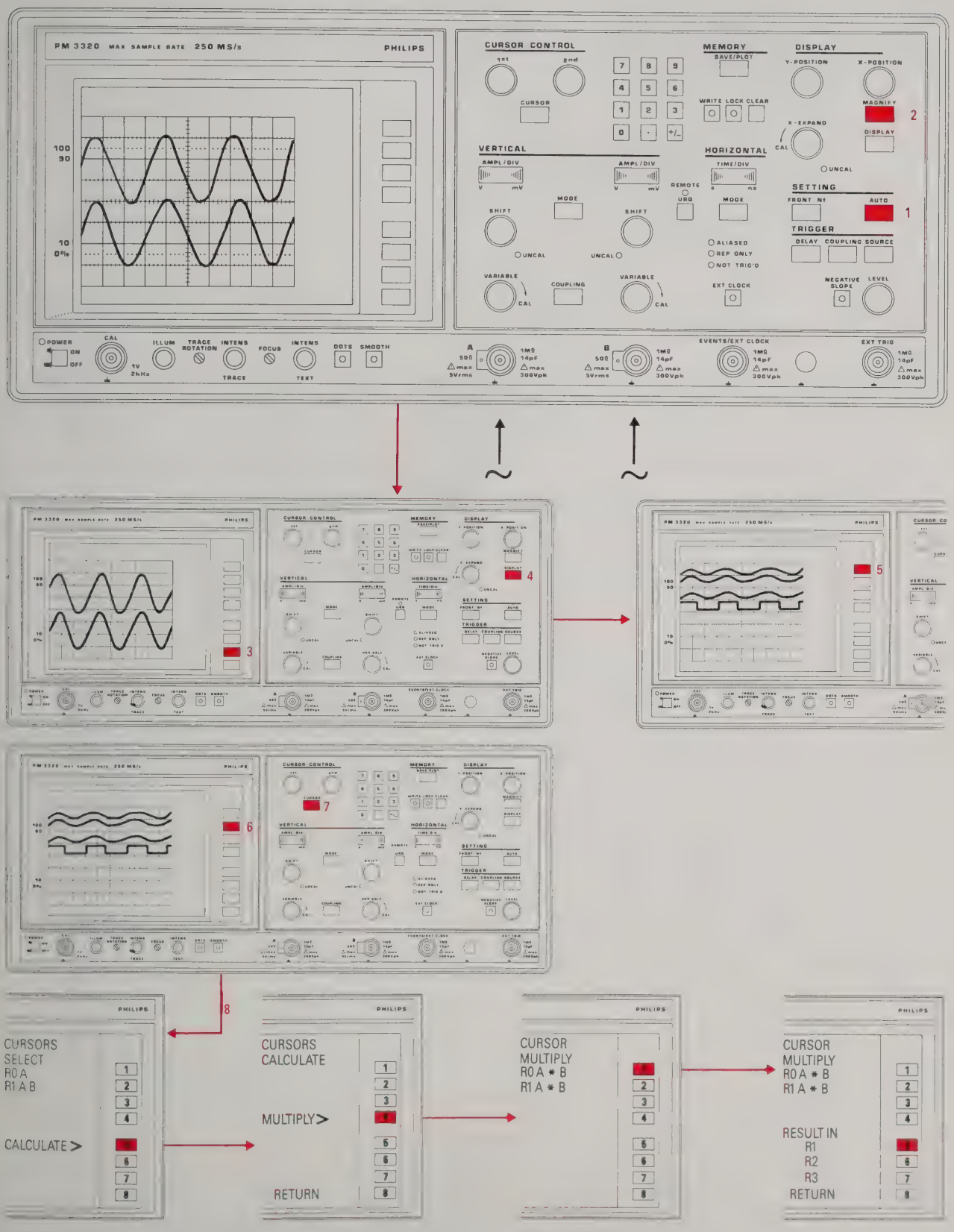
MULTIPLY Cursor selected

For multiplying or squaring traces within registers selected via the DISPLAY menu:

- Push softkey "CALCULATE"
- Push softkey "MULTIPLY"
- Push softkey of selected register "R0 A * B"
  - If only one channel present, the square of the signal can be calculated; e.g. A * A
  - After register selection, the text "RESULTS IN R1... R3" is visible in softkey area
- Push "R1", to select storage register
  - This starts the multiply action and stores the results

NOTE:

The result of a multiplication of signals A and B in memory R0 can be displayed in a second memory (e.g. R1). Therefore select two registers for display (R0 and R1).


PM 3320 MAX SAMPLE RATE 250 MS/s
PHILIPS
CURSOR CONTROL
MEMORY
DISPLAY
VERTICAL
HORIZONTAL
SETTING
TRIGGER
CURSORS SELECT
R0 A
R1 A B
CALCULATE >
CURSORS CALCULATE
MULTIPLY >
RETURN
CURSOR MULTIPLY
R0 A * B
R1 A * B
RESULT IN
R1
R2
R3
RETURN

RESTART Cursor selected

Text "RESTART" only visible in softkey area and effective if register R0 is selected for display (DISPLAY menu) and cursors are in one of the traces.

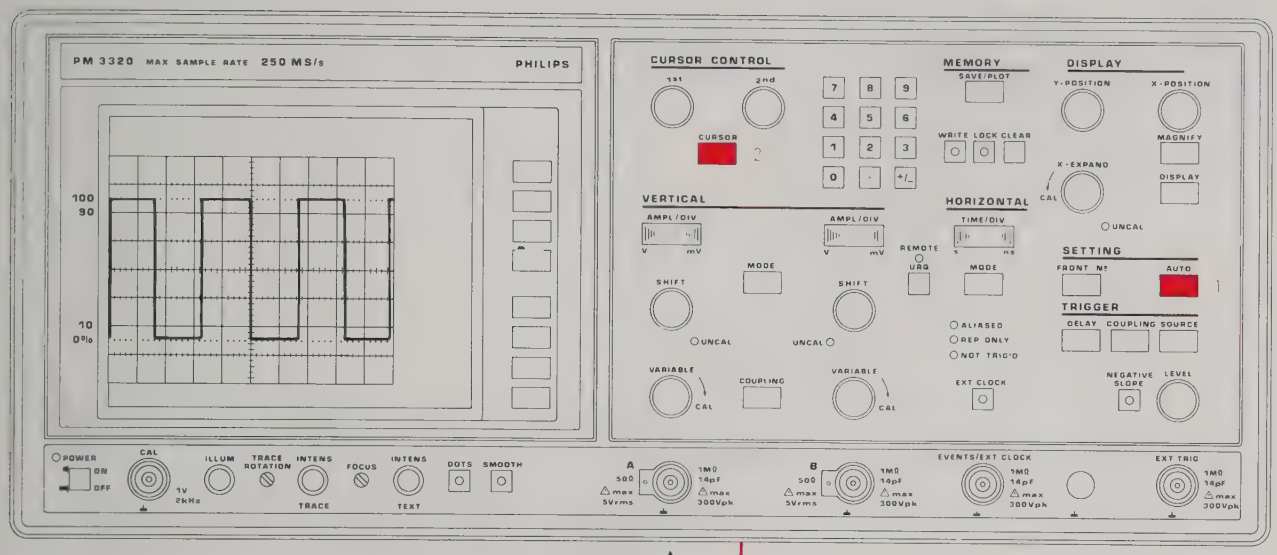
- Push softkey "R0 A B"
  - Text "RESTART" is displayed in softkey area.
- Push softkey "RESTART".

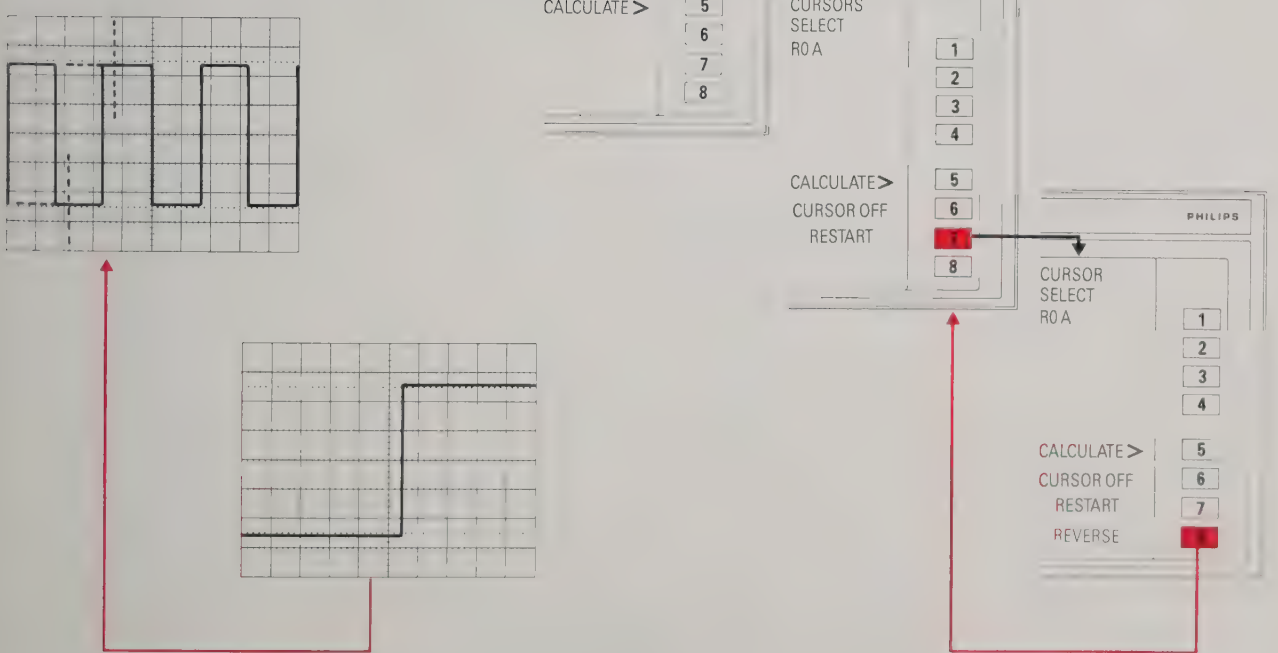
NOTE:

This automatically provides:

- Horizontal acquisition expand for the signal part between the two cursors.
- A new trigger-delay setting in DIV for the 1st cursor.
- A new and faster time-base setting related to the time between cursors.
- A new recorded signal with these settings, on the first active trigger.
- A message if further RESTART is not possible.

- Push softkey "REVERSE' to recall settings before restart action.


PM 3320 MAX SAMPLE RATE 250 MS/s
PHILIPS
CURSOR CONTROL
MEMORY
DISPLAY
VERTICAL
HORIZONTAL
SETTING
TRIGGER
CURSOR
SAVE/PLOT
WRITE LOCK CLEAR
Y-POSITION
X-POSITION
MAGNIFY
X-EXPAND
DISPLAY
UNCAL
AMPL/DIV
TIME/DIV
MODE
SHIFT
COUPLING
VARIABLE
REMOTE
URQ
ALIASED
REP ONLY
NOT TRIG'D
EXT CLOCK
FRONT N°
AUTO
DELAY
COUPLING
SOURCE
NEGATIVE SLOPE
LEVEL
POWER
ON
OFF
CAL
ILLUM
TRACE ROTATION
INTENS
FOCUS
DOTS
SMOOTH
EVENTS/EXT CLOCK
EXT TRIG


PHILIPS
CURSORS
SELECT
R0 A
CALCULATE >
CURSOR OFF
RESTART
REVERSE

TRIGGER DELAY in Time or Divisions

- Push front-panel "DELAY".
- Push softkey "TIME":
  - The text "TIME" in softkey area is intensified; the delay is displayed in seconds.

TO ADJUST DELAY

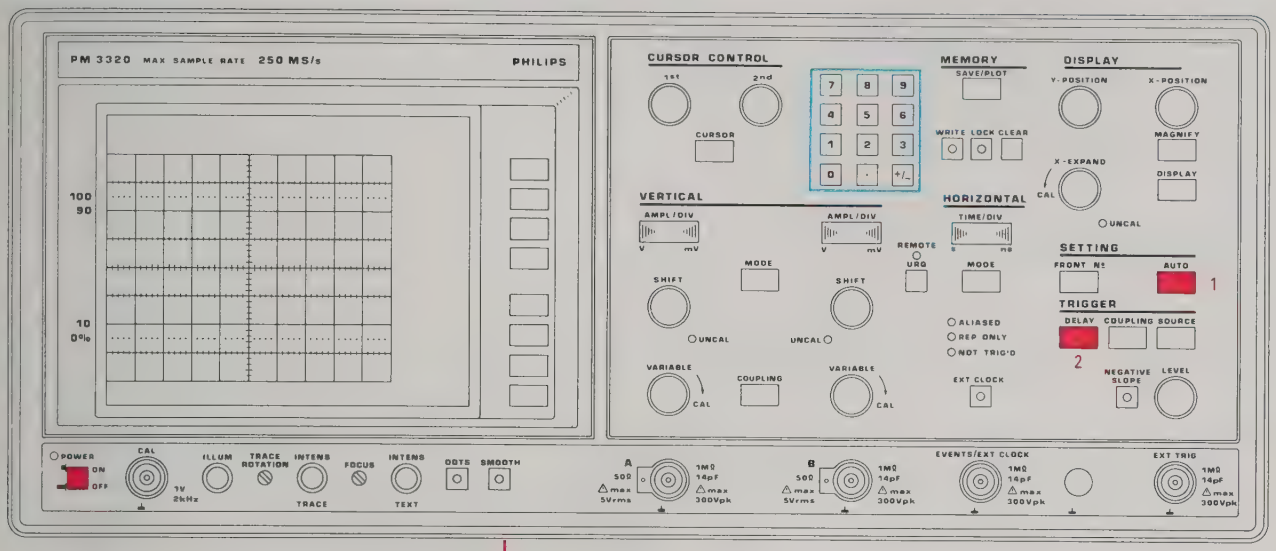
EITHER:

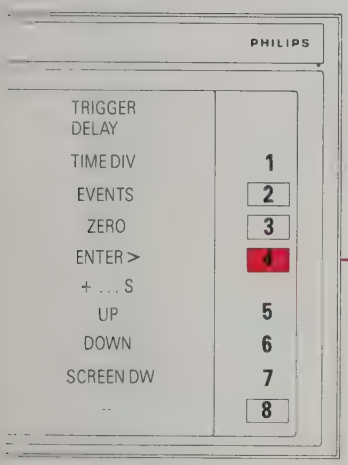
- Push softkey "UP" to increase, or "DOWN" to decrease required delay.
  - Softkey "SCREEN DIV" sets UP/DOWN steps to either 10 divisions (SCREEN intensified) or 1 division (DIV intensified).

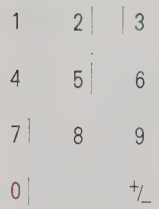
OR:

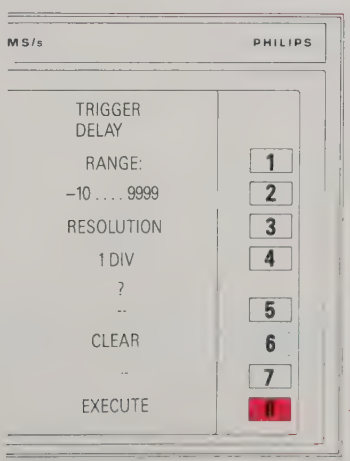
- Push softkey "ENTER"
- Push front-panel "KEYPAD" buttons for required delay:
  - Range and value indicated in softkey area: ..s (ms and us).
- Push "EXECUTE" to enter selected trigger delay value.
  - Use softkey "CLEAR" to cancel trigger delay value if error is made.

TRIGGER DELAY IN TIME OR DIVISIONS









TRIGGER DELAY BY EVENTS Delay selected

– Push softkey "EVENTS".

  • Trigger delay is displayed in number of events; delay range = 1...9999 EVT.

TO ADJUST DELAY

EITHER:

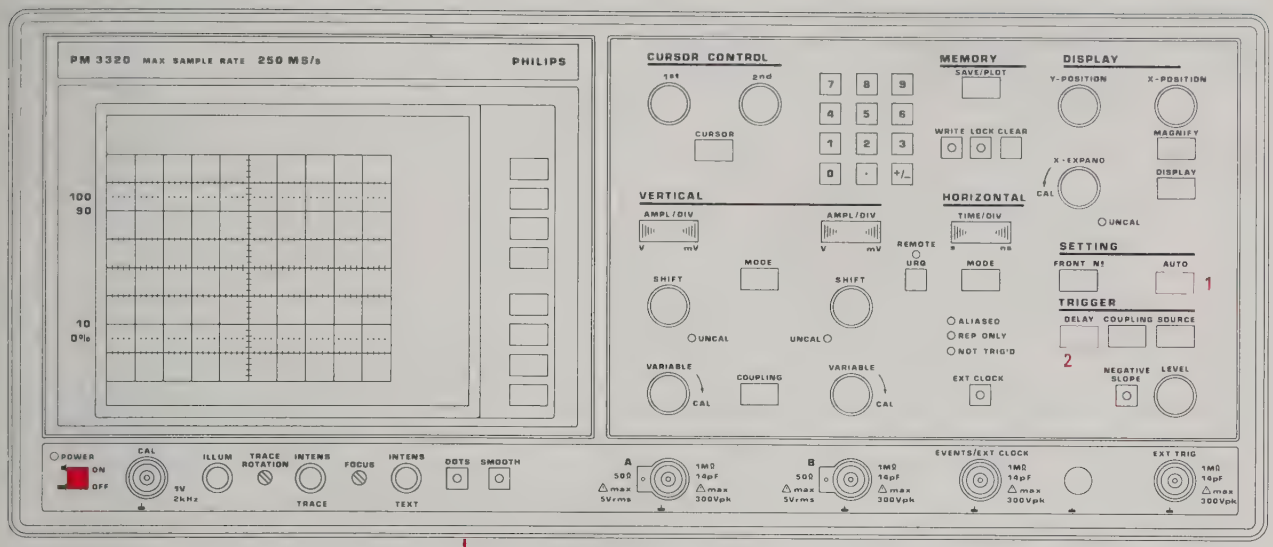
– Push softkeys "UP" or "DOWN" in combination with "SCREEN DIV".

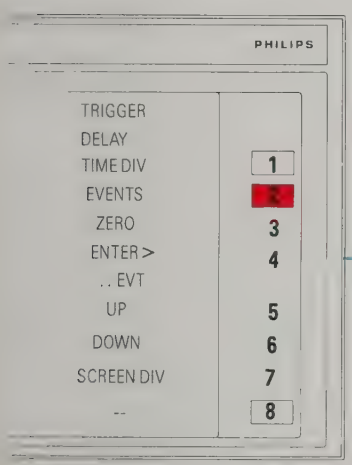
OR:

– Push softkey "ENTER" and use front-panel "KEYPAD". (see page 44).

NOTE:

  • For Trigger Source and Coupling, see page 51.



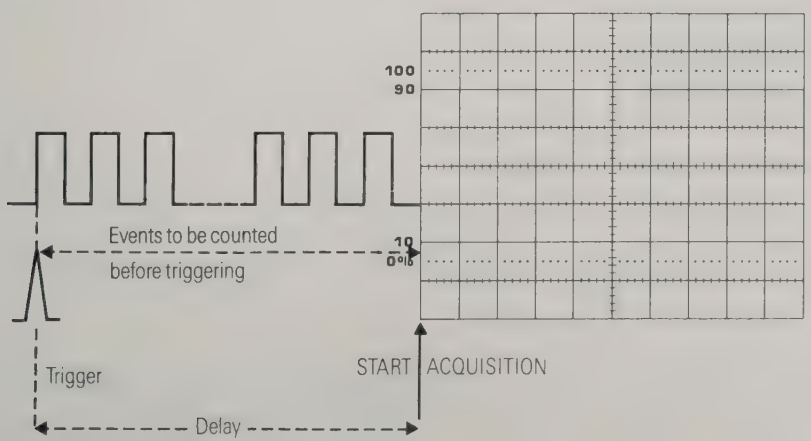


3

(For 1 Event)

Keypad entry (see page 47)

Events



TRIGGER SOURCE AND COUPLING

– Push front-panel "SOURCE".
– Push softkey for source, as required:

NOTES:

- AUTO selection sequence is:
  – EXT (if present).
  – lowest frequency signal (if A and B present)
  – channel A (if no input)
- DUAL triggering allows instrument to trigger on either positive or negative slope of a signal.
  Both +ve and –ve levels can be adjusted by the front-panel "LEVEL" control (see SINGLE-SHOT, page 53).
- "SLOPE +–" overrules DUAL selection.

– Push front-panel "COUPLING".
– Push softkey for coupling, as required:

NOTES:

- AUTO is normally selected (AC trigger coupling).

Permitted combinations:		
AC		
AC	HF reject	(50 kHz)
AC	LF reject	(50 kHz)
DC		
DC	HF reject	
AUTO		
AUTO	HF reject	
AUTO	LF reject	
TVF –	Frame sync for CCIR 625-525 lines (no DUAL possible)	

For external coupling selection:

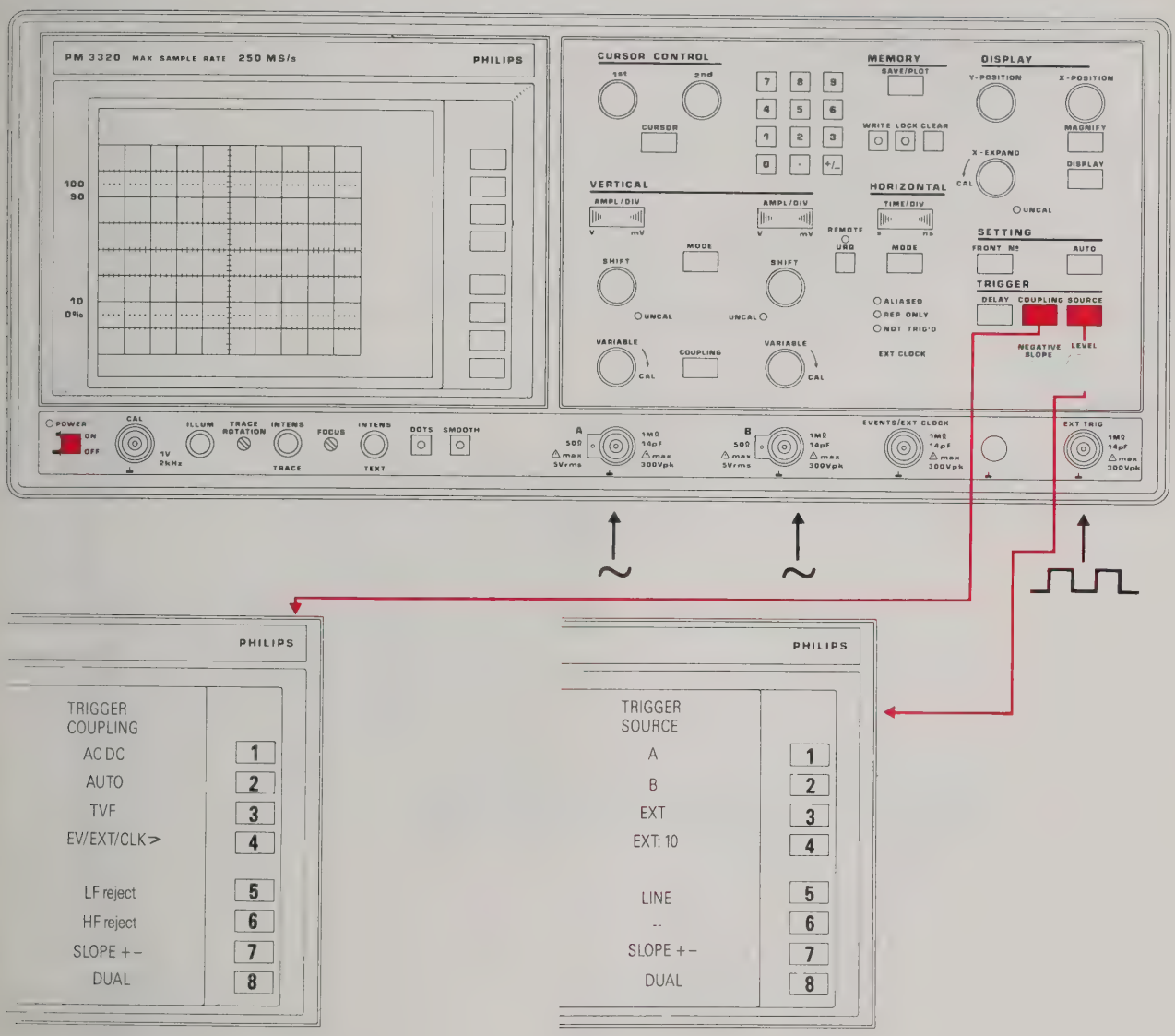
– Push softkey "EV/EXT/CLK"

– Select softkey, "TTL", "ECL" or "VAR":

- Trigger level indicated by "E" on left-side of trace.
- "VAR" can be set by trigger "LEVEL" control and . . . V is indicated in softkey area.

– Push softkey "SLOPE +–", if required:

- Selected function is intensified and indicated by pilot lamp in "NEGATIVE SLOPE" pushbutton.


PM 3320 MAX SAMPLE RATE 250 MS/s
PHILIPS
CURSOR CONTROL
MEMORY
SAVE/PLOT
DISPLAY
Y-POSITION
X-POSITION
MAGNIFY
DISPLAY
VERTICAL
HORIZONTAL
SETTING
FRONT №
AUTO
TRIGGER
DELAY
COUPLING
SOURCE
NEGATIVE SLOPE
LEVEL
ALIASED
REP ONLY
NOT TRIG'D
EXT CLOCK
POWER
ON
OFF
CAL
ILLUM
TRACE ROTATION
INTENS
TRACE
FOCUS
INTENS
TEXT
DOTS
SMOOTH
EVENTS/EXT CLOCK
EXT TRIG
PHILIPS
TRIGGER COUPLING
AC DC 1
AUTO 2
TVF 3
EV/EXT/CLK> 4
LF reject 5
HF reject 6
SLOPE +– 7
DUAL 8
PHILIPS
TRIGGER SOURCE
A 1
B 2
EXT 3
EXT: 10 4
LINE 5
-- 6
SLOPE +– 7
DUAL 8

SINGLE SHOT

– Push front-panel "HORIZONTAL MODE"

  • RECURRENT-mode is selected.
  Direct mode (5 s/div...200 ns/div) is most suitable for single-shot events.

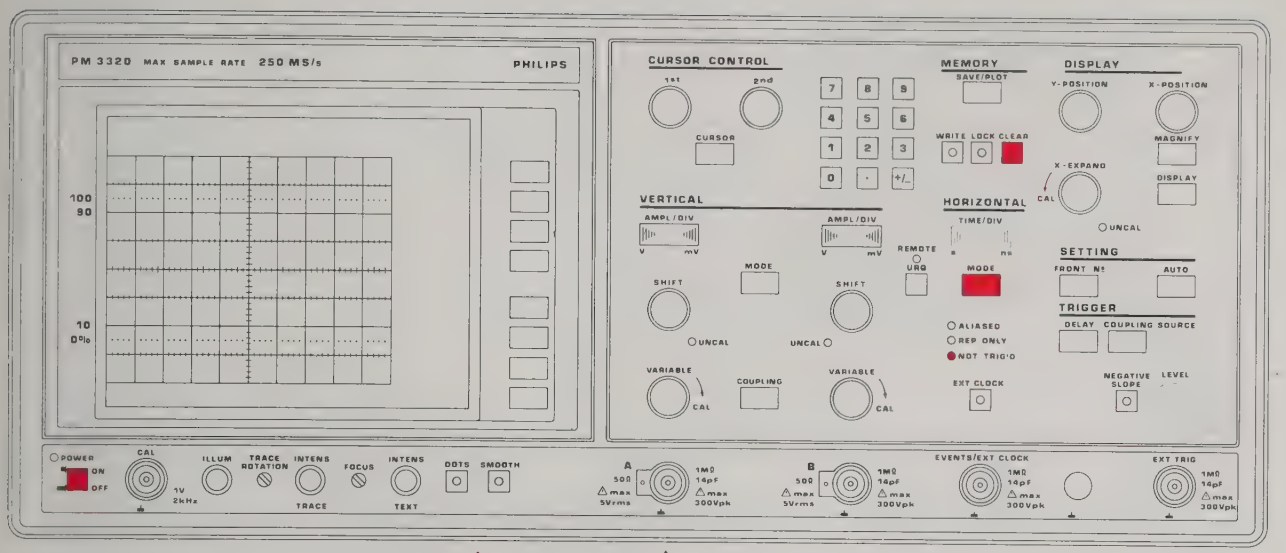
– Push softkey "SING.ARMD"

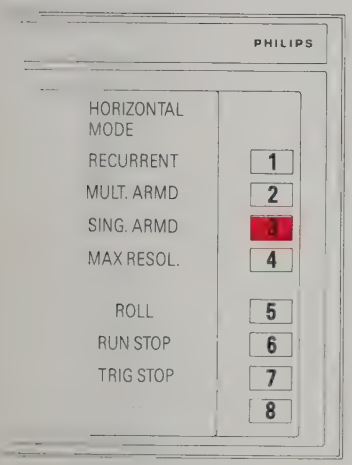
  • Text "ARMD" is intensified until single-shot signal is recorded in R0. (text "ARMD" is then at low intensity).

– Push softkey "SING.ARMD" or front-panel "CLEAR" to capture a new signal.

NOTE:

DUAL triggering is useful when polarity of single-shot event is unknown or variable. If MAX RES (maximum resolution) is selected single-shot works as single-scan. This means that at each event new samples will be taken until all dot positions are filled with new information.





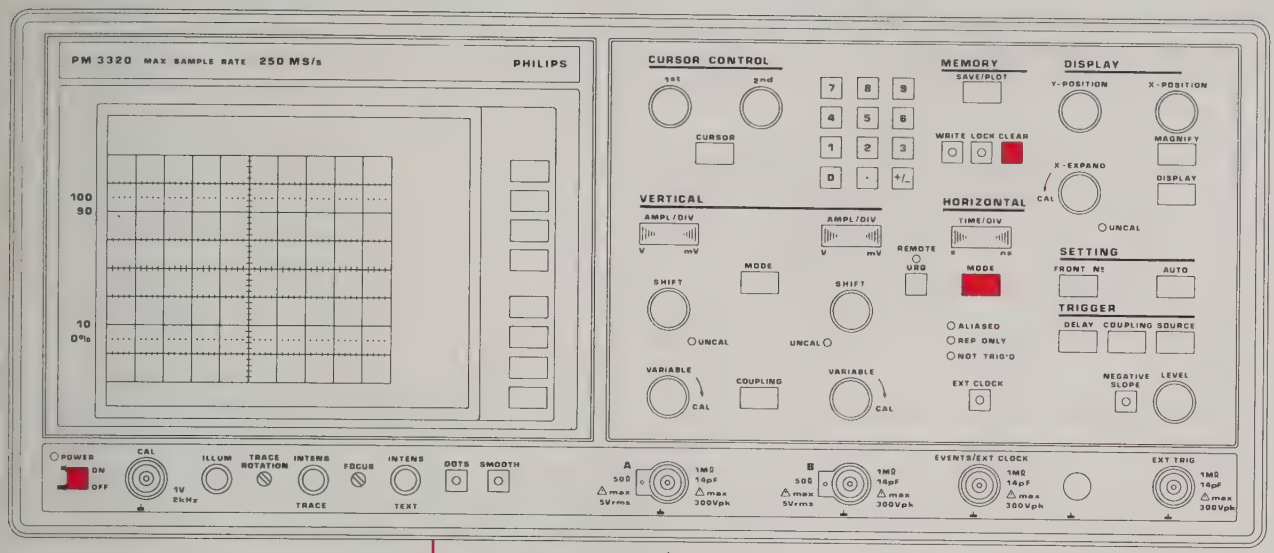
INDICATIONS	PUSHBUTTONS
	SING. ARMD
NOT TRIG'D	
(SINGLE-EVENT CAPTURED IN R0)	
NOT TRIG'D	SING. ARMD
	SING. ARMD
	or CLEAR
NOT TRIG'D	
(NEXT SINGLE-EVENT CAPTURED IN R0)	
NOT TRIG'D	SING. ARMD

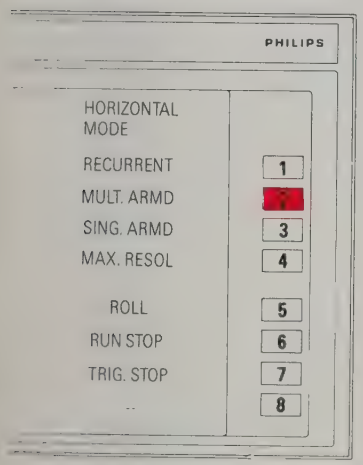
MULTIPLE-SHOT

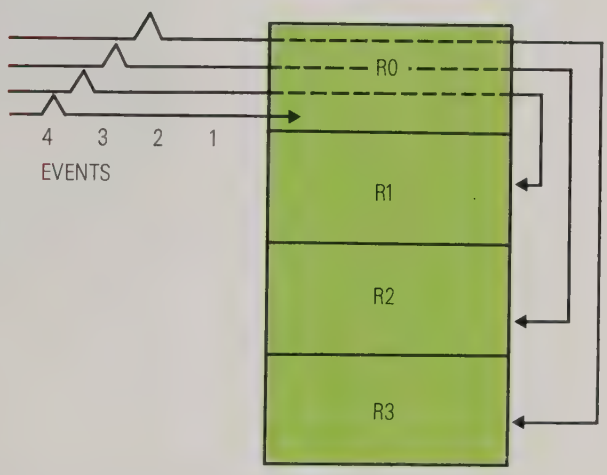
- Push front-panel "HORIZONTAL MODE"
- Push softkey "MULT.ARMD":
  - Four single-shot signals are captured sequentially and recorded in R3, R2, R1 and the last one in R0.
  - Text "ARMD" is intensified until the end of the cycle.
- Push softkey "MULT.ARMD" or front-panel "CLEAR" to start a new cycle.

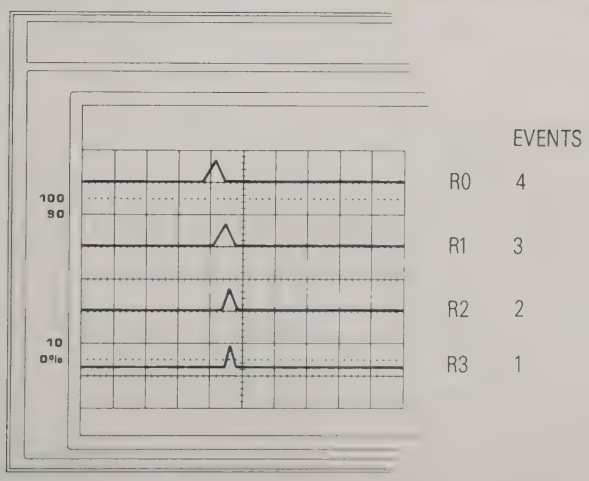
NOTES:

MAX RESOL activates a higher resolution in the time-base range 200 ns/div...500 us/div. Only for repeatable signals.
If MAX RESOLUTION is selected in combination with multiple shot, multiple shot works like multiple scan. This means that memory R0 is copied after all 4k dots are filled with new information.


PM 3320 MAX SAMPLE RATE 250 MS/s
PHILIPS
CURSOR CONTROL
MEMORY
SAVE/PLOT
DISPLAY
Y-POSITION
X-POSITION
MAGNIFY
DISPLAY
VERTICAL
HORIZONTAL
SETTING
FRONT №
AUTO
TRIGGER
DELAY
COUPLING
SOURCE
NEGATIVE SLOPE
LEVEL
EXT CLOCK
EXT TRIG
POWER
ON
OFF
CAL
ILLUM
TRACE ROTATION
INTENS
TRACE
FOCUS
INTENS
TEXT
DOTS
SMOOTH


PHILIPS
HORIZONTAL MODE
RECURRENT 1
MULT. ARMD 2
SING. ARMD 3
MAX. RESOL 4
ROLL 5
RUN STOP 6
TRIG. STOP 7
8


4 3 2 1
EVENTS
R0
R1
R2
R3

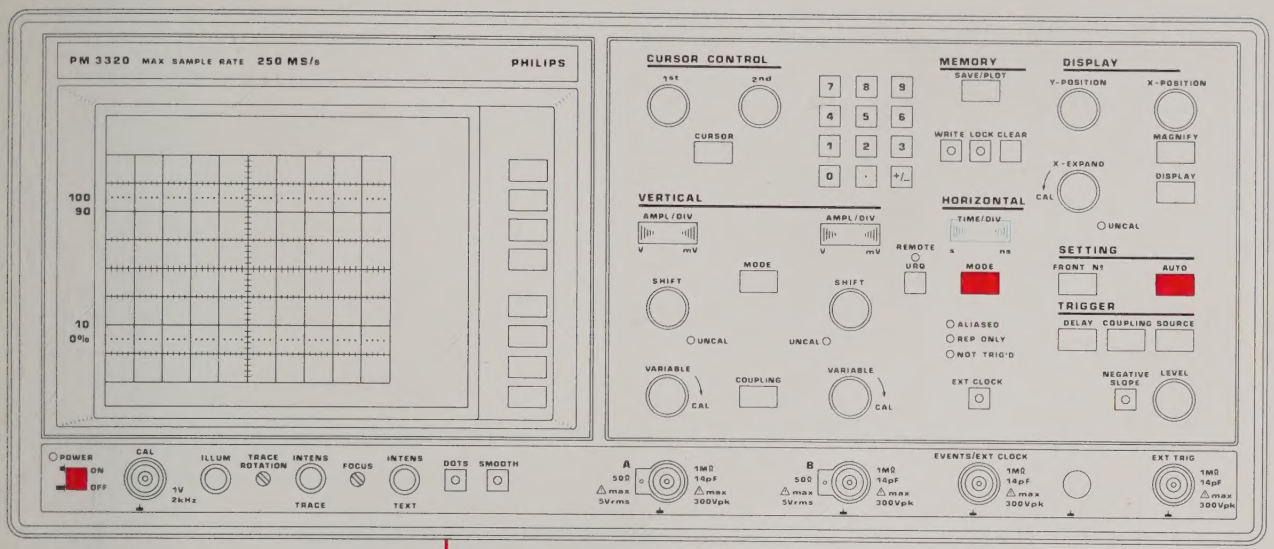

EVENTS
R0 4
R1 3
R2 2
R3 1

ROLL MODE

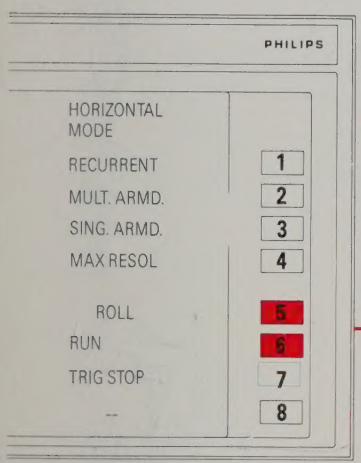
- Push front-panel "HORIZONTAL MODE"
- Push softkey "ROLL"
- Select "TIME/DIV" 50 ms/div. . . . 360 s/div.
- Push softkey "RUN" to start roll action
  - Text "RUN" is intensified during roll action
  - Signal is recorded in R0 as it moves across screen
- Push softkey "STOP" to stop roll action
- Push softkey "RUN" or front-panel "CLEAR" to start a new trace

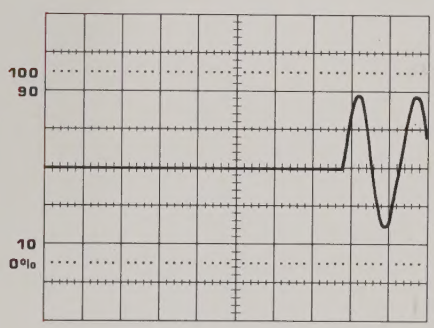
NOTES:

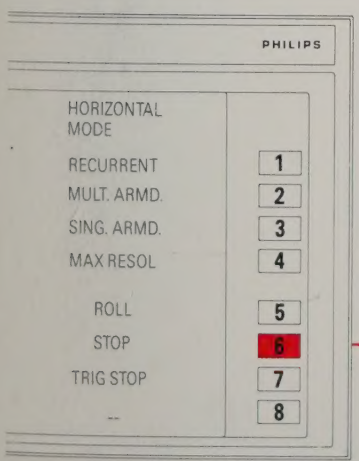
- "TRIG STOP" softkey enables roll-action to be stopped on receipt of a trigger (See Trigger Delay, page 46). If zero trigger delay selected, roll action continues to the trigger stop point at the left of the screen and stops (text "STOP" intensified). Selecting positive delay sets this point to the left. Negative delay (pre-trigger) sets this point to the right. The range is –10 . . . . 9999 div.
- AUTO trigger generates a trigger pulse every 0.1 sec.
- To copy contents of R0 in R1, R2 or R3 select SAVE/PLOT menu (page 29).
- To suppress noise, use AVERAGE function (page 35) for extra sampling.

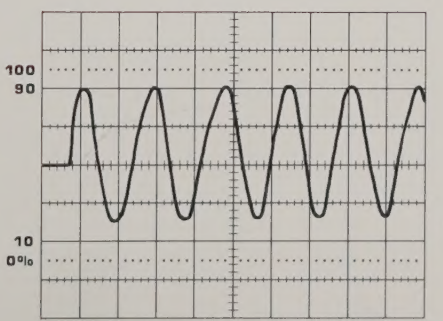


(50 ms/div. . . . 360 s/div.)









PHILIPS

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